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THE ROLE OF CONSUMERS AND FOOD INDUSTRY IN SUSTAINABLE FOOD PACKAGING

Danna Camila Diaz Pabon

International Business
Bachelor's Thesis
Supervisor: Susan Grinsted
Date of approval: 8 April 2020

Declaration

By completing this cover sheet and declaration, I confirm that this assignment is my own work, is not copied from the work (published or unpublished) of any other person, and has not previously been submitted for assessment either at Aalto University, or another educational establishment. Any direct or indirect uses of material (e.g.: text, visuals, ideas…) from other sources have been fully acknowledged and citedaccording to the conventions of the Harvard Referencing System.

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ABSTRACT OF
BACHELOR'S THESIS

Author: Danna Camila Diaz Pabon
Title of thesis: The role of consumers and food industry in sustainable food packaging

Date: 9 April 2020

Degree: Bachelor of Science in Economics and Business Administration

Supervisor: Susan Grinsted

Objectives
The main objectives of this study were to understand consumers and industry's role in sustainable food packaging through different product types. In other words, understanding the relationship between both parties through areas such as behavior, education, product development and marketing. Furthermore, how these areas affect both consumers' and industry's decision making processes.

Summary
The research of this thesis was conducted using a quantitative survey, where consumers were asked to answer questions related to sustainability. The survey was indirectly measuring education, attitude and behavior. In addition, an interview was conducted to analyze the industry perspective. Based on previous research, it was hypothesized that respondents will present inconsistent choices among knowledge, behavior and attitude questions among the survey. This study was not able to provide statistically significant results. However, the results presented a positive pattern regarding the hypotheses expectations.

Conclusions
Consumers are aware of sustainability as an unified rather than a holistic concept. In addition, consumers' credibility on sustainable products is high as long as they aware of environmental issues. Therefore, non-highly committed consumers find conflicting thoughts when decision making process include information they are not familiar with in food products labelling. This leading to a conflict where skepticism is raised and product perception plays a relevant role. While the industry is going through a development path where they are attempting to produce innovative packaging that addresses food waste and plastic consumption. Besides, expanding the concept of sustainability to emerging interested consumers.

Key words: Sustainability, Sustainable Food Packaging, Consumer Behavior

Language: English

Grade:

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ABSTRACT

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1. INTRODUCTION

1.1. Background

Environmental consequences affect everybody's life style. In the EU, 26 million tonnes of plastic waste are generated annually, about 59% of EU's plastic waste comes from food packaging. Moreover, about 8 million tonnes of plastic waste are thrown in the ocean globally every year (LUT university, 2019).

Nowadays, a relevant amount of people have presented changes in lifestyle. Younger generations have incorporated larger changes in values and behaviour than previous generations. Within those changes, environmental awareness has increased substantially among them. Thus, industries have also presented a constant change in business models that has led to the production of 'environmental products' or less harmful products for the environment. However, statistics present that plastic usage in food packaging is still a problem. Thus, even though consumers present high interest in environmental issues and industries are partially attempting to produce products that address those needs and beliefs, it would be beneficial to understand inconsistencies among this circle.

1.2. Research problem

Consumers' perspective about sustainability has been studied from many different perspectives. Most research is based on their attitudes or behaviour. However, very few have studied both or have included other areas at the same time.

On the other hand, food industry plays an important role when understanding consumers and developing product design. Thus, both parties will be the focus of this thesis aiming to evaluate the role of both along the process of understanding and incorporating sustainability practices, such as sustainable food packaging. Hence, how can sustainable food packaging improve the overall state of environment and plastic consumption?

In order to respond the research problem mentioned above, this thesis aims to focus in understanding consumers and industry's role towards sustainable food packaging through the research objectives.

1.3. Research questions

This thesis aims to answer the following research questions (RQs).

RQ1: How developed is consumers understanding of sustainability?
RQ2: What is consumers' perspective and behavior towards food packaging?
RQ3: What are the effects of consumers' attitudes on the packaging industry?
RQ4: What is industry's perspective about sustainability?
RQ5: What is the relation between both of them?

1.4. Research objectives

This thesis aims to understand consumers and industry's role in sustainable food packaging through different product types. In other words, understanding the relationship between both parties through areas such as behavior, education, product development and marketing. Furthermore, how these areas affect both consumers' and industry's decision making processes. Therefore, this research aims to analyze and explore different perspectives towards sustainability and how the above areas vary among young consumers.

2. LITERATURE REVIEW

2.1. Introduction

Sustainability has raised the consciousness of today's younger generations, which has promoted development of daily products and changes in lifestyle. This emerging awareness has forced the market and therefore, suppliers to address certain demand for green products.

However, the reality is that roughly one third of the food produced in the world for human consumption every year — approximately 1.3 billion tons — gets lost or wasted (Food and Agriculture Organization of the United Nations, n.d.). About 25 percent of household waste depicts food waste due to packaging size or design (Suggitt, 2018). The food packaging industry has tended to follow consumers' needs and beliefs offering diverse products that attempt to address environmental issues in addition to its packaging main function. Nevertheless, about 8 million metric tons of plastic are thrown into the ocean annually. According to our world in data (Ritchie, 2018), 146 million tons of plastic were globally generated by the packaging sector in 2016; this being the dominant sector in plastic usage.

Sustainable packaging has increased at the same time as awareness of consumers. Multiple companies have applied sustainability initiatives that attempt to move from sustainability as an abstract goal to an immediate priority, however, there is not much knowledge of consumers' perspective about sustainable packaging (Nordin & Selke, 2010). This association depicts contradictory results considering there is an increasing number of consumers who are 'green motivated'. However, these efforts do not represent an aligned positive response. Consumers' perception seems to be misunderstood by the industry.

Prior research has focused on consumers' perception on product strategy through labelling, product packaging and product perception on consumer purchasing decisions (Mohebbi, 2014; Singh & Pandey, 2012; Rokka & Uusitalo, 2008; Maniatis, 2015). Nevertheless, there is a gap in research about the relation of consumers' education, behaviour and attitude. In a society saturated with information, uninformed

consumers and overlapping information creates confusion on them. These factors increase complexity in understanding products' sustainability, which increases consumers' skepticism. Their knowledge on sustainable products can be reflected on their attitudes and therefore, their behaviour. However, willingness does not necessarily reflect behaviour. Consumers may believe their attitude leads to sustainable actions, and their awareness may not be represented on their daily purchases.

Literature was analysed in two main segments, consumers' and food packaging industry. Consumers' literature was reviewed within three sections, behaviour, education and sustainability perception. On the other side, industry's literature was reviewed within sustainability perception and its implications. Furthermore, frameworks and definition of sustainable terms were considered in order to have a better understanding. Lastly, the conceptual framework will be introduced.

2.2. Sustainability definition and goals

According to Russell (2013), sustainability refers to the balance between social and economic needs, and the connection with the services the environment offers for us. Sustainability expert John Elkington developed a theory called Triple Bottom Line to explain this balance; it consists of sustainability as balance through three elements (Elkington, 1997). First, the concept of people as representing ethical and beneficial business practices. Secondly, the planet as developing environmentally sound products from sustainable manufacturing. And eventually, profits as it includes benefits for the company, employees, shareholders and the value chain (Russell, 2013).

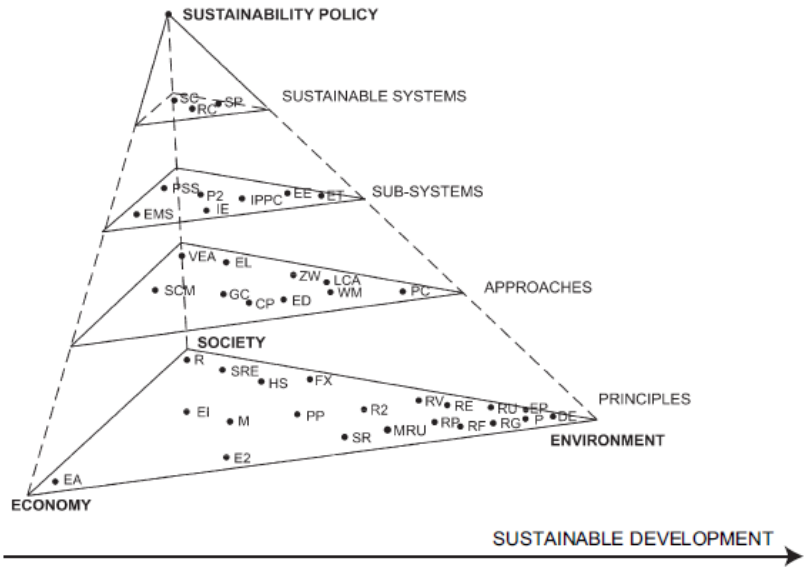
For packaging, sustainability refers to the integration of sustainable development objectives and implementation of strategies to develop businesses in order to address social aspects while addressing environmental concerns regarding to product and package systems. In addition to the consideration of products' life cycle throughout the supply chain stages (Nordin & Selke, 2010). Although Russell is aware of the balance between human social, economic needs and environmental

resources, he also states that environmental, social, and economic aspects of sustainability are independent and often overlap (Russell, 2013).

The concept of packaging should be evaluated and adopted in a more holistic way. Literature reveals that sustainable packaging is often confused with recyclable packaging. Recyclable packaging is defined as packaging made of materials such as glass, metal, cardboard, paper that can be used again, usually after certain industrial processes. However, the most common form of recycled packaging is corrugated cardboard, which is utilized broadly in different industries (GWP Group, 2019). While recycling is a practice of sustainability, recycling packaging does not reflect the complete concept of sustainable packaging. The concept of sustainable packaging will be address in later sections.

There is an assumption that there is an existing gap of misinformation between the industry and consumers' side. Therefore, sustainability terms should be recognized better for understanding sustainable packaging successfully. Literature often relies more on one of the sustainability approaches, social, economic, environmental, but Triple Bottom Line should be applied from the industry to its products throughout its life cycle assessment (LCA), which presents a systematic analysis of the environmental impact of products during their life cycle (Wikström et al., 2013; Grönman et al., 2012; Russell, 2013). However, most of the literature reviewed stressed the importance of finding a balance between them.

Consequently, Glavič and Lukman (2007) conducted a study that included a literature survey about sustainability and summarized the definitions of the terms creating a framework that includes all approaches of sustainability mentioned previously. The framework is developed in a hierarchical classification and relationship of the terms that might contribute to a better and easier understanding. The following figure presents the framework reflecting that each stage includes a holistic approach based on three main areas, society, economy and environment.



CP, cleaner production; DE, degradation; EA, environmental accounting; ED, eco-design; EE, environmental engineering; EI, ethical investment; EL, environmental legalisation; EMS, environmental management strategy; ET, environmental technology; E2, eco-efficiency; F*X*, factor *X*; GC, green chemistry; HS, health and safety; IE, industrial ecology; IPPC, integrated pollution prevention and control; LCA, life cycle assessment; M, mutualism; MRU, minimization of resource usage; P, purification; PC, pollution control; PO, policy; PP, "polluter pays" principle; PSS, product service system; P2, pollution prevention; RC, responsible care; R, reporting to the stakeholders; RE, recycling; RF, remanufacturing; RG, regeneration; RP, repair; RU, reuse; RV, recovery; R2, renewable resources; SC, sustainable consumption; SCM, supply chain management; SD, sustainable development; SP, sustainable production; SR, source reduction; SRE, social responsibility; VEA, voluntary environmental agreement; WM, waste minimization; and ZW, zero waste.

Figure 1. Clasification of sustaiability terms (Glavič & Lukman, 2007)

Thus, in order for sustainability be successful, it is necessary to understand it in a conceptual way first and then, apply frameworks such as the previously mentioned to contribute building a clear understanding of it. Hence, Section 4 will illustrate what the industry covers for the packaging industry.

2.3. Consumer's perception

Literature recognizes that the industry has continuously improved products assessment incorporating sustainable values (Singh & Pandey, 2012; Restuccia et

al., 2010). In addition, consumers' awareness and interest on products that apply sustainability values should represent a positive relation between supply and demand according to available products on the market. However, there is a puzzling relation between consumers and industry. The following sections address relevant insights that have been found about consumers in previous research that attempt to resolve this inconsistency.

2.3.1. Growing demand

The emerging interest in more sustainable products has increased among consumers and has led to higher demand for 'green products'. According to Whang et al (2015), a rising number of consumers have increased their involvement in sustainable issues by extending their ethical values. This trend in emerging consumers values depicts that society prioritizes quality of life benefits through financial values that reflect willingness to pay for certain distinction of a product and the effort, being it human, material or energy needed to run the industrial system that produces it (Russell, 2013).

Consequently, the industry has addressed this demand by generating strategies on evaluation and improvement of product and packaging systems were conventionally developed around the waste management hierarchy, reduction, reuse, recycle and recovery (Nordin & Selke, 2010). However, as Nordin and Selke state on their research, the aim of sustainable packaging focuses on improvement of product's-package life cycle during the supply chain by evaluating all possibilities for improvement, optimization and transportation to align with the principles of sustainability development. Thus, these efforts in providing solutions that contribute to sustainability are failing and outdated.

Whereas, some studies stress that interest of packaging research has primary focused on communicative characteristics of the package (labelling, functionality, color), few cases that include environmental packaging as an issue present more relevance to attributes such as functional packaging characteristics that influence consumers' purchasing decisions and undermine environmental characteristics. This misconception of environmental attributes is explained by the lack of practical

importance (Rokka & Uusitalo, 2008). However, Bech-Larsen suggested in 1996 that there might exist a group of consumers with strong preferences for green packaging, which indicates there might be space in the market for this type of packaging. In that order, recent studies have displayed the existent increasing demand that depicts a strong preference and willingness to purchase products that include sustainable development. Thus, products that include sustainable packaging have a strong recognition by motivated sustainable consumers.

2.3.2. Gap attitude/behavior

Despite the industry's efforts and consumers' values, there seems to be an inconsistency between consumers' awareness and the globally amount of waste coming from packaging. This contradiction can be explained through different reasons.

According to Löfgren (2006), consumer interaction with the product depends on the design of the product, the consumer preferences and experiences, and the context of the consumer date. Consequently, some studies have found a gap between consumers' behavior and attitude. Studies and psychological evidence established in 1980s display that there is a high preference for ethical or 'green' products, but there is a low consistence between behavioral and attitude measures (Nordin & Selke, 2010; Rokka & Uusitalo, 2008).

A survey conducted by McKinsey (World Business Council for Sustainable development, 2009) in different countries such as Brazil, Canada, China France, Germany, India, UK and USA linked a consumers' inconsistency in their attitude and behavior with willingness to pay. It identified that 53% of consumers were concerned about environmental issues but were unwilling to implement them in their purchasing decisions, whereas 13% of consumers were willing to pay higher prices for products that incorporate sustainable development but were not applying it (Nordin & Selke, 2010). The results portray that willingness does not specifically represent behavior. Elements such as sustainable knowledge and involvement, motivation and cultural values can be attributed to influence such results. Besides, the influence culture has

in decision-making processes. However, these elements were not considered in the majority of studies reviewed.

Other reasons that have attempt to explain this inconsistency include time lag between value and behavioral changes, lack of necessary motivation, opportunities for change and ability to change, awareness variation between types of behavior and conflicting preferences between environmental and other characteristics (Alwitt and Pitts, 1996; Bech-Larsen, 1996; Thøgersen, 1999, 2004; Thøgersen & Ölander, 2003; Moisander, 2007, Uusitalo, 1989, 1990a,b; Rokka & Usitalo, 2010).

To address such inconsistency, Rokka and Uusitalo conducted a survey that aimed to analyze consumers' behavior regarding importance of green packaging compared with other product attributes - brand, price, package and convenience of use. The study considered functional drinks as the product of study. Two different brands were included, a local brand and its multinational competitor. Both products are packed in the same sized packages and occupy the same price category. The distinction was the material and convenience of packaging, resalable and non-resalable packaging (Rokka & Uusitalo, 2010).

By giving the option to choose their preferences of both products, including mentioned attributes and demographic questions; the results indicate that packaging was an important attribute for consumers' choice, contributing 34% of the total attributes. The results illustrate that environment-friendly package alternatives are preferred by consumers (Rokka & Uusitalo, 2010). The study aims to break with traditional attitude-based research and present consumer choices between realistic product alternatives. Therefore, it attempts to depict consumer behavior including attitudes implicitly. In addition to the results mentioned above, the study concluded that there are no associations between their preferences and demographic variables. However, the survey was conducted in Finland. It only represents Finnish consumers and consumer behavior cannot be generalized. Education in Finland is standardized and those standards are very high, which can explain consumers' awareness and their preferences when buying daily products.

Thus, their study presents primary research that addresses the attitude/behavior inconsistency through a new approach. However, it does not include consumers'

knowledge about sustainability applied in the selection of products. Although, it can be assumed that certain knowledge is included or perceived by them. The study suggests that according to their findings it will be worthwhile for marketers to target the environmentally sensitive consumers because the size of the group is not marginal. In that order, as the authors state, for a better understanding of sustainable packaging it is relevant to analyze specific products choices that consumers face daily.

2.3.3. Terminology gap consumers/industry

A study developed by Perception Research Services focused on consumers' perspectives on sustainable packaging. It displayed lack of consumers' involvement in sustainable packaging efforts. The study revealed that terminology as well as the concept of sustainable packaging is unfamiliar for consumers, who are unable to distinguish it from the concept 'recycle' (Nordin & Selke, 2010). In addition, Whang et al. (2015) assert in their study that the abundance of information has increased complexity in consumer decision-making. Thus, both findings attempt to make an assumption that explains the reasons behind the consistency between attitude/behavior. It might not be an issue about double standards or unwillingness to pay. But instead, consumers seem to be overwhelmed by information and misinformation.

In that order, there is a substantial terminology gap between consumers and industry. On one side, consumers associate sustainable packaging with recyclable packaging and on the other side, part of the industry interpret the sustainable packaging concept with cost effectiveness and environmental footprint throughout the supply system (Nordin & Selke, 2010).

Moreover, according to the International Organization for Standardization (ISO) in their standard ISO 14021, claims that attain sustainability should not be used in labelling practices, for instance the statement 'sustainable'. Although, the presence of these terms attempts to have a positive effect that aims to promote sustainability, it may create confusion and incorrect perception by consumers as their interpretations of sustainability vary. Consequently, the usage of terms such as 'post-consumer

materials', 'recycled content', 'renewable', 'biodegradable' and claims as 'made partially from' were found to lead to confusion and skeptical reactions from the consumers (Nordin & Selke, 2010).

2.3.4. Perceived skepticism

In addition to consumers' understanding of sustainable packaging as whole, prior studies have stood out the issue of intangible characteristics of sustainable packaging (Vermeir & Verbeke, 2006). Since consumers face difficulties in perceiving substantial sustainable distinctiveness, consumers are unable to entirely trust and will to purchase sustainable products due to its credibility (Whang et al., 2015). Furthermore, concerns about overpricing of organic products have made consumers skeptical about certain sustainable products. As Singh and Pandey (2012) state in their study, some consumers will be prepared to pay a premium price if they perceive additional value, such as improved performance, function, design, visual appeal or taste.

2.4. (Food) Industry's perspective

Previous research established that economic, social and environmental areas overlap and such quandary creates a misleading understanding of sustainability, assuming that these areas are mutually exclusive. Most companies in the industry tend to focus on economic and environmental approaches rather social insights (Nordin & Selke, 2010). Therefore, it is relevant to describe what sustainable packaging comprises from the industry perspective. The following sections address relevant areas related to packaging and sustainability towards the industry outlook.

2.4.1. Packaging's role

Packaging is an indispensable component that affects practically every industry. However, some industries are more sensitive than others are to it. Every product, from organic grown food to technological products, need some kind of packaging

during its existence for protection during transportation, handling, storage and use. Thus, 99.8% of all food and beverage items are at one time covered by some kind of packaging. Consequently, food industry is constantly developing new technologies that enhance quality of products, shelf-life durability and avoidance of producing waste and food spoilage (Restuccia et al., 2010).

Food packaging must succeed reaching its purpose of product protection and good delivery condition, which includes no sanitary risks to human health, besides meeting requirements of significant component information, price and consumers convenience (Russell, 2013). In fact, packaging nowadays comprises a more compounded term. Packaging is closely related to marketing communication, logistics and distribution management, sustainable marketing and branding (Simms & Trott, 2010). Thus, Hellström and Saghir (2007) reached the conclusion that packaging assists three key communication functions. First, information including content, source. Second, means of handling and promoting the product. Lastly, enhancing communication with consumers. However, there seems to be something missing or declining in the last two core functions. Industry is not completely filling consumers' needs according to their sustainable beliefs.

2.4.2. Sustainable packaging relevance

The resources employed to produce packaging and resultant issues regarding waste management have been the subject of environmental concern. Most of the attention has focused on minimizing environmental impacts associated with sourcing and producing packaging materials. Besides end-of-life resource recovery (Öztek & Çengel, 2013). Nevertheless, the value chain has the responsibility to clarify that sustainability is not equivalent to recycling and biodegradability. Instead, sustainability is associated to the overall resource efficiency of the supply chain (Russell, 2013).

Moreover, changes from retailing practices to consumers' life style present major challenges for the food packaging industry. In fact, 70 percent of brand and purchase decision-making are done in the store while buying, including consumers that enter

with shopping lists and buying intentions for certain products (Kauppinen-Räisänen, 2014). While at the same time, those changes in consumers' practices act as driving forces for development of new and improved packaging practices where an optimal trade-off between environment and food takes place (Ahvenainen, 2003; Ahvenainen & Hurme, 1997). This representing the fundamental concept of active and intelligent packaging. Intelligent packaging employs technology that includes monitoring of product conditions during its life cycle through sensors or indicators in order to communicate details about the quality of the product to consumers (Mohebbi, 2014). Technology that includes new interaction between food and its environment compared to traditional packaging (Restuccia et al, 2010). Over the last years, active and intelligent packaging has perceived a substantial growth and emerging change as development of new technologies have challenged conventional food packaging (Kotler & Keller, 2006). Research establishes that it was initially introduced in Japan 50 years ago and it has been slowly raising attention in Europe and in the USA for the last 30 years.

2.4.3. Life cycle assessment of products

For designing food sustainable packaging, life cycle assessment should be one the most important factors to consider. Wikström et al. (2013) suggest that LCA of eaten food should be specifically should be incorporated. As the amount of single and elderly households has been increasing among many countries, the amount of food might be reconsidered. A Swedish food waste diary study revealed that households recognized 'too large packaging' as one important factor for food waste (Williams et al., 2012). Thus, as Russell (2013) asserts, when developing sustainable packaging it is vital to make a comprehensive assessment considering complete life cycle process and holistic, anthropogenic insight of sustainability in order to reach optimal social and economic effects.

Previous research has stated that packaging has a minor environmental impact compared with its content (Russell, 2013). Such statement has been established based on supply chain assessments instead of innovative life cycle assessment. Food spoilage presents a high environmental impact. Thus, the impact that conventional packaging represents should not be underestimated. The package of

the product cannot be distinguished from the product contents and cannot be assessed as an independent product (Grönman et al, 2012). Other studies suggest that the problem with LCA concerned to products and their packaging is that the food losses are often neglected (Williams et al, 2008). Therefore, the package is a relevant element to include in the LCA filling the requirements and needs of product besides the protection and protection and prolongation of the product at the self.

As Grönman et al. (2012) state, in most cases larger environmental impacts come from product losses at different stages of the life cycle instead of the production of the product and its package. Thus, the after sold product and its package impact on the environment represent high importance that might be recognized when assessing the LCA of products.

2.4.4. Product development and marketing

As research has shown, besides packaging reaching its main function of product protection, packaging nowadays might comprise a larger function. Simms & Trott (2010) assert that it is closely related to marketing communication, logistics and distribution management. Hence, packaging represents a beneficial tool for the industry as a channel to influence consumers.

In addition, Silayoi and Speece (2007) gathered main packaging elements that influence on consumers' buying decision, including visual and informational elements. Visual elements include graphics, color and size of the package, while informational elements include information about the product and technology employed in the package. However, packaging should represent a positive impact in consumers; Mohebbi (2014) asserts that there is a gap in literature regarding packaging analysis from different insights, specifically in elements such as color packaging and its effectiveness. In that order, colors such as green could represent sustainable products but there is no research done that establishes its efficacy. Therefore, research about how brands manage and reflect their company's approach through visual elements such as color is missing.

Besides visual elements as color, the usage of terminology related to sustainability included in products' labelling also represents a communication channel from the industry towards consumers. However, it could signify a positive contribution to consumers, it often losses that direction. Terms such as Phosphate Free, Recyclable, Refillable, Ozone Friendly, and Environmentally Friendly are some statements that consumers relate to green marketing (Singh & Pandey, 2012). They are sustainable related terms; however, it does not represent the complete approach of sustainability. The presence of certain terms with sustainability have presented to be confusing for consumers. In a society saturated with information, uninformed consumers and overlapping information creates confusion on them. Thus instead of decreasing consumers understanding and perception of sustainable products as literature asserts, labelling can contribute in a positive way with informational purposes while encouraging sustainability.

Thus, Rokka and Uusitalo (2008) concluded that product development and marketing, sustainable packaging and labelling should be considered properly. Because the package becomes an essential factor in consumers' decision-making process since it communicates with consumers when they are buying in the store (Silayoi & Speece, 2017). In addition, as Nordin & Selke assert, one of sustainable packaging contributions is to provide information and alternatives to consumers in order to encourage and promote life style changes that lead to sustainable consumption.

2.4.5. Importance of consumers

Previous research has established that often most energy is used during the products' consumption stage throughout its life cycle. Therefore, consumers are largely responsible for sustainability success (Nordin & Selke, 2010). As it has been stated before, the large amount of consumers' involvement in environmental issues is far from a marginal amount. This representing a continuous change in life style and decision making processes from younger generations.

Thøgersen et al. (2012) conducted a study that aimed to analyze these aware consumers compared to conventional consumers. The comparison was based on

time during decision-making processes at a retail store. Their analysis was established from an observation and follow-up interviews. This research presented realistic data from a specific daily product. They analyzed consumers' selection of organic representing the sustainable option and conventional option for milk. The study concluded that consumers do not spend more time and effort than conventional consumers when buying milk. Both groups apply simple and efficient strategies, nevertheless, they differ in their choice heuristics and considerations. Thus, the study reflects that decision-making on sustainable products follows similar processes as selecting conventional products. Consumers presented similar behaviors but different product attributes approaches. Therefore, consumers' choices on sustainable products represent their involvement on environmental issues, as previous literature has noted.

Thøgersen et al. (2012) asserted that there is no existent empirical study that focuses on a broad approach based on how environmental issues are reflected in consumers' daily purchases. Ryynänen and Rusko (in press) evaluated professionals view on consumers' packaging relations. They concluded that companies might be able to develop packaging that aligns consumers' values and practices if the industry understand challenges and behaviors that are faced by consumers' every day. Thus, objective research based on specific products might be useful for the industry to understand consumers' perception of available products offered in the market and challenges consumers face on a regular basis.

2.4.6. Sustainable business opportunities

2.4.6.1. Sustainable business thinking

According to Edenhofer et al. (2014), a sustainable society cannot be achieved if individual agents advance on their own interests independently. Thus, companies need the contribution of a wide set of stakeholders to deliver sustainability. Sustainable decision-making should involve value judgements and ethical considerations, such as, social, economic, and ethical analyses as well as considering forms of value that include human well-being, cultural values, and non-

human values (Edenhofer et al., 2014). In addition, Krantz (2010) suggests that companies will need bigger changes that include new business models to generate greater trust and greater stakeholders' engagement founded on a long-term vision in order to achieve sustainability.

Bocken et al. (2013) suggest in their study that the framework for a business model might contain a structured insight of sustainable business thinking that includes purpose mapping, opportunities for value creation and value creation in the company. Tools as the incorporation of design and innovation to business models have been a matter of a study (Osterwalder & Pigneur, 2010; Baumann et al, 2002; Bocken et at, 2011). Nevertheless, Krantz (2010) proposes a wider participation of stakeholders, environment, society and value creation need to be evaluated.

Sustainable business thinking refers to the idea in which businesses represent a positive force that contributes to society and environment while generating profit (Bocken et al., 2015). Built on Boons and Lüdeke-Freund (2013) research, sustainable business innovation model displays sustainable business thinking, which is explained as an innovative approach realized by creating value through superior customer value whereas, contributing positively to the company, society and environment while minimizing harm. In that order, sustainable business thinking represented within sustainable business innovation models might include different approaches that include value judgements and ethical considerations in order to support and achieve a sustainable society.

2.4.6.2. Competitive strategies: Shared value

A study conducted by Natural Marketing Institute on segmenting consumers in 2006 found that an emerging 7% of consumers are 'green motivated' and are willing to change their brand loyalties to 'green' brands (Nordin & Selke, 2010). These results indicate that sustainability as a concept represents a key attribute to products in addition to price, performance and brand. Consequently, including sustainability approaches in product development creates a distinction over conventional products. Thus, not a marginal amount of consumers will be attracted by this attribute.

In his study, Mohebbi (2014) asserts that effective consumer-based packaging can benefit companies by creating a competitive advantage, increasing consumers' satisfaction and therefore, increasing sales. Nevertheless, such strategy is not that simple. It can be extended to Porter's theory (Sharedvalue.org, n.d.) about creating shared value.

Figure 2. Shared value (Sharedvalue.org, n.d.)

Porter's theory (Sharedvalue.org, n.d.) is a competitive strategy that focuses on maximizing competitive value by solving social problems addressing new customers, markets, cost savings, et cetera. According to Figure 2., business opportunities, social needs and corporate assets constitute it. Therefore, including sustainability in business practices such as sustainable packaging, sustainable food packaging generates a distinction from conventional packaging. As most companies are still employing to conventional packaging practices due to costs and narrow strategies, shared value theory will further generate larger benefits, as environmental and life cycle assessments date.

2.4.6.3. EU position

Due to contradictory findings between involvement on environmental issues and consumer's behavior, policymakers find difficulties to establish environmental awareness is a relevant product attribute for consumers (Rokka & Uusitalo, 2008). However, the European commission (2007) utilizes an eco-labelling approach that its categorized in EU eco-labels, international eco-labels, and privately sponsored eco-

labels. Such categorization aims to request for corporate responsibility and set standards among producers. However, literature presented that other countries have developed more strict and demanding regulations in order to encourage innovative sustainable packaging. For instance, Xu et al. (2012) describes that in China eco-labels present significant results for consumers willing to pay more for sustainable products.

On the other hand, Mohebbi (2014) claimed that efficiency and primary importance of packaging is neglected in developing countries and non-competitive markets, stressing that the value of packaging belongs to developed and industrialized countries. Furthermore, sustainability rejection by non-involved consumers on environmental issues leads experts to focus on packaging only on sales product fostering, excluding incorporation of sustainability approaches. However, there is a large mistaken assumption. It is not a secret that developing countries have different needs and priorities. But it would be a mistake not to consider their contribution to sustainability development in a slow pace. On the contrary, a set of countries as EU members with steady markets do not present a substantial sustainability development. Thus, countries cannot be compared for composed factors such as economic development and cultural values that differ between individuals. Literature does not make a distinction on this relevant factor. Since culture reveals education levels, it represents a drastic insight that has been ignored by previous research.

2.5. Conceptual framework

The conceptual framework below (Figure 3) examines the relationships between industry and consumers. It includes elements that need to be considered for an effective understanding of sustainability in food packaging.

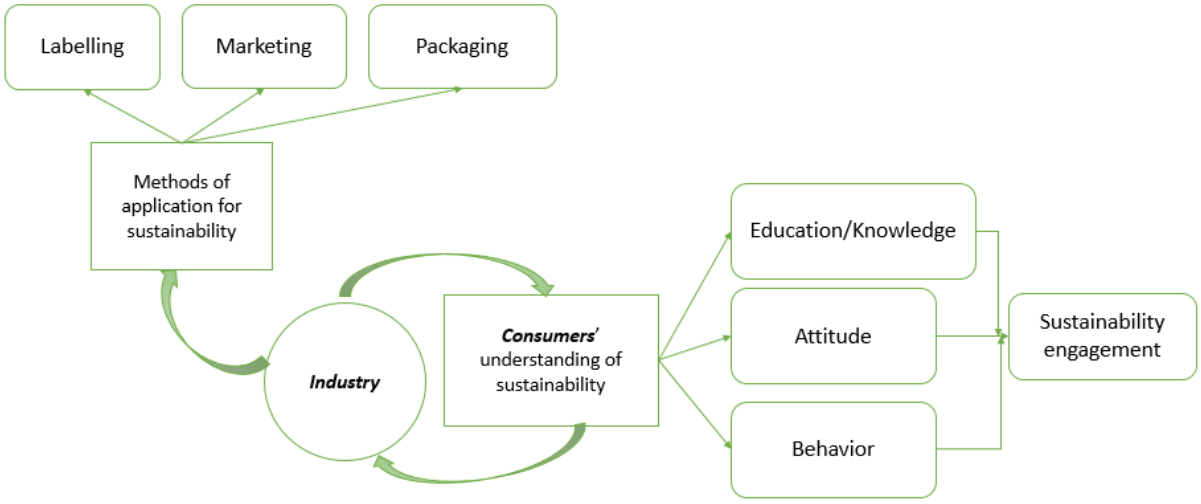


Figure 3. Consumers' perception of sustainability and Industry's method of application.

As figure 3 shows, industry and consumers are directly related. Consumers' understanding of sustainability is reflected in their education or knowledge, attitude and behavior, which leads to consumers' engagement towards sustainability and its practices. Moreover, the industry presents its sustainability approach through different methods such as labelling, marketing and packaging. Thus, industry and consumers are highly correlated and indispensable for the effectiveness of each other. Hence, for a successful understanding and development of sustainably, it is necessary to employ a broad concept of sustainability that includes environment, society and economy.

3. METHODOLOGY AND DATA COLLECTION

This thesis was developed throughout primary data after literature was reviewed. Therefore, primary data was gathered through quantitative data which was collected through a survey and qualitative data that was considered as supporting material for it. The purpose of the quantitative data was to generate and collect numerical data from a certain sample of young consumers to quantify their perspective towards sustainability and sustainable packaging. While qualitative data aimed to generate a deeper understanding and reflection of the industry's perspective. Both of them were chosen in order to compare the results to previous research and to address the hypotheses presented above.

A survey was conducted with the purpose of finding direct information focused on consumers. This approach was chosen for its geographical access and time advantages, besides the access to data received. Prior research has focused on consumers' perception based on attitudes. However, areas that were included in this case have not been considered earlier, this being the major reason to explore consumers' emerging insights. The complete survey is presented in Appendix 1.

A survey was used to measure consistency in consumers' perspective requesting answers from questions that included specific situations and terms related to sustainability. However, the survey also included an optional open-ended question that aimed to comprehend their understanding of sustainability. It was proposed in order to allow consumers to reflect on their understanding of the idea of sustainability with their own words.

On the other hand, qualitative data was obtained through a brief interview. The interview was semi-structured, multiple questions were planned but not all of them were used. Thus, with this type of structure there would be space for new questions and the interview could turn into a discussion. The interview was conducted with the purpose of receiving industry's insights in a direct way. This qualitative approach was chosen for the facility of communication between the interviewee and the interviewer. In addition to the ability of inspecting information in a deeper and customized manner. Hence, the interview was an appropriate channel for receiving information

from the industry that lead to a better understanding of it. This data is not presented in “data collected”. However, it is included in “main findings”.

According to previous research in the field, primary research intended to evaluate the following hypotheses. They have been created from points raised in the literature review and by taking into account the objectives of this research.

H1: The concept of sustainability is not clear for consumers.

H2: The concept of sustainability is confused with recycling and biodegradable related terms by consumers.

H3: Consumers find sustainable terms overwhelming when included in packaging while buying food products.

H4: A considerable amount of consumers perceive the importance of food products that include sustainable approaches.

H5: A considerable amount of consumers perceive the importance of sustainable packaging.

H6: Consumers will pay a premium price if they perceive additional value, such as products including sustainable packaging.

H7: There is a low consistency between behavior and attitude towards ‘green products’.

H8: There is low consistency between willingness and behavior regarding the purchase of ‘green products’.

H9: There is an existent lack of involvement in sustainable efforts based on education and motivation.

H10: Consumer education is reflected in their behavior and attitude towards sustainable practices.

H11: Consumers present conflicting preferences between environmental and other product features.

3.1. Study design

3.1.1. Quantitative data

The questionnaire was made through an online tool called Webropol. The survey included 33 mandatory questions and one optional question, where respondents were able to express their understanding of sustainability as much or as little as they wanted. The questions were designed in three indirect sections, so respondents were not able to see them explicitly. These sections aimed to measure knowledge, behavior and attitude towards sustainability and sustainable products.

Since these measures are holistic and the answers can be unconsciously changed by the order of the questions, the survey was designed in the following order, behavior, knowledge and attitude. Thus, attitude related questions would not affect their responses related to their behavior for social or personal pressure.

The survey aimed to break with attitude-based research and presented real product options. Thus, behavior was measured presenting pictures of real food products available in common supermarkets. These products include tomatoes, pepper, apples and pears that were presented giving two options. The ‘sustainable option’ being unpacked and the second ‘prepacked option’ representing unnecessary packaging. In addition, jam and juice product choices were also included, aiming to measure product attributes such as product perception, price, quality, and package functionality. Thus, Jam was presented in a glass and plastic package presentation with different brands. However, juice question was the same juice. It was the same brand offering different packages and sizes. One being glass and the second being cardboard. Through this realistic product selection, consistency between behavior and attitude was aimed to be measured.

Besides the open-ended question, to be able to measure consumers’ perceived knowledge about sustainable terms, question 11 was used to measure familiarity with “sustainable packaging” statement. The scale proposed was used from previous research, Young 2007). Followed up questions, 11 and 13, aimed to measure consumers understanding of concepts that previous research asserts are often

confused with the definition of sustainability, such as “recycling” and “biodegradable”. In addition, ‘Level of perceived environmental education’ subscale was created from question 9 in order to analyze information channels in consumers that contribute to sustainability understanding. Finally, two questions were included for informative purposes in the final part of this section. They included numerical information about plastic waste generated by the packaging industry and the amount of plastic thrown in the ocean annually.

Attitude based questions included different scales that aimed to resolve if there is any inconsistency between attitude and responses from the behavior section. Thus, to measure if it is only willingness. For instance, question 21 aimed to measure packaging relevance as product attribute in a likelihood scale. Furthermore, different subscales were created among this section. Questions 17-20 were used from previous research (Öztek & Çengel, 2013) and were gathered into a new subscale called ‘Sustainability engagement’. ‘Perceived effective credibility’ was created from statements that included practices in daily life such as ‘Printing on recycled materials using processes such as waterless printing’ and other 6 practices that question 25 proposed. Lastly, question 23 was used to measure importance of product attributes, as well as to create the ‘Product attribute relevance’ subscale.

Finally, after the survey was created and checked, it was tested by 3 people in order to test if it was logically made and to measure how long it took to complete as a respondent. Thus, the interview took about 7-10 minutes to complete. Time and responses were relative to the type of respondent and its engagement with sustainability and the survey.

3.1.2. Qualitative data

On the other hand, an interview was carried out for the effectiveness of research. The contact was chosen for its positive alignment to the research problem. The interviewee’s tittle is ‘Junior Researcher’ in the project. The local project will be referred to as PH further on. The project develops packaging solutions that

simultaneously address food protection and the constant increasing concern of plastic packaging waste.

The interview included questions that attempted to understand their perception of the packaging industry, their strategies and challenges that faced regarding the consumers-market relation. The full transcript is presented in Appendix 3.

3.2. Data collection

The survey was shared to students of Aalto University Business School Mikkeli Campus through the academic email. As the research not only comprises Finnish consumers, people from other nationalities were contacted through private messages.

There were no demographic requirements for respondents. However, European nationalities and people living in Europe were encouraged to answer the survey. Respondents happened to be between the ages 18 and 30. However, one respondent was 45. As research is based in Europe and addressed to the youngest generations, older respondents than 30 years and people not living in Europe were not included in the data analysis. There were 106 respondents in total, while around 250 people were contacted.

No previous knowledge about sustainability was required. The survey was aimed to measure daily behavior and attitude about daily choices regarding sustainability engagement. Thus, anyone could have answered it.

On the other hand, the interview was done face-to-face. The questionnaire included 16 questions where not all of them were asked at the end. Only 11 questions were asked due to the relevance according to the responses given during the interview. Some answers given from the interviewee answered more than one question and provided deeper information than expected.

4. DATA COLLECTED

4.1. Demographics

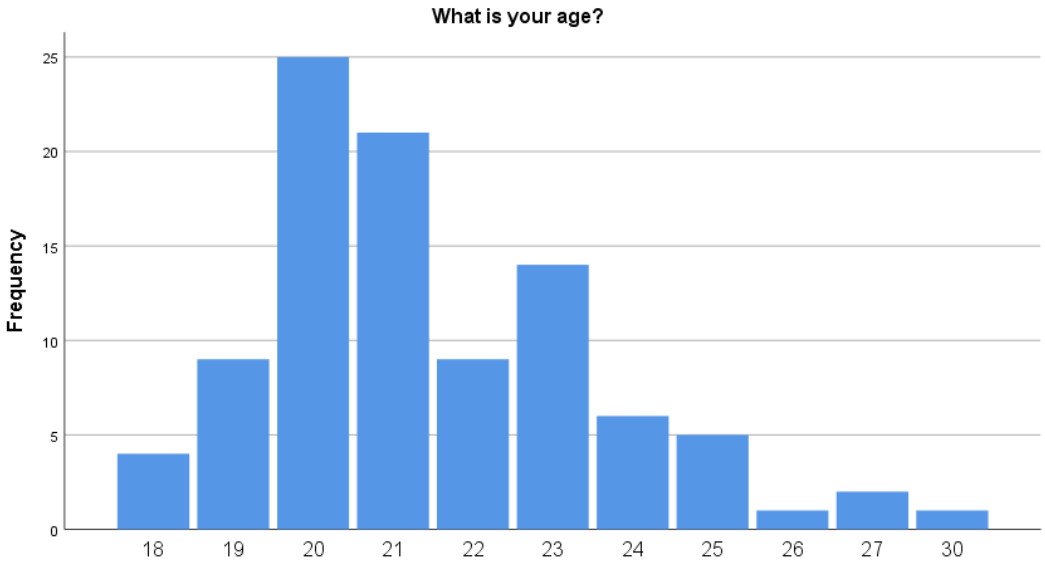


Figure 4. Age of respondents (Question 27).

The ages of respondents ranged from 18 to 30, with a mode of 20 years (M=21,47 SD=2,170).

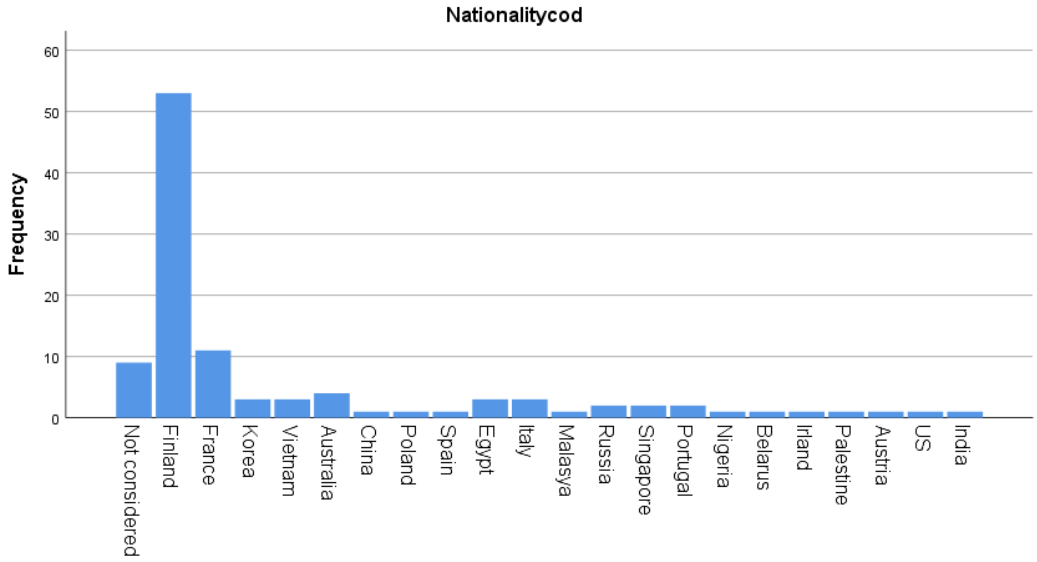


Figure 5. Nationality of respondents (Question 29).

The majority of respondents were from Finland, which was expected, since search is done from a Finnish university. A total of 21 nationalities were recorded.

In addition, there were 50 female and 48 male responses, for a total to 98 respondents that finished the survey (Question 28).

4.2. Consumers' knowledge

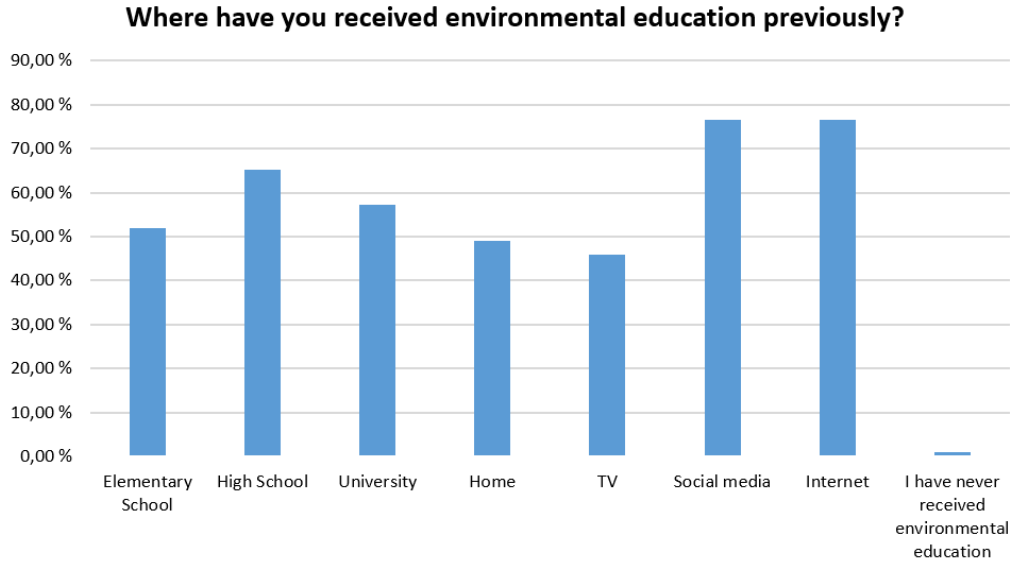


Figure 6. Environmental education received (Question 9).

Social media and internet were the most selected options with 77% (n=75) of respondents each of them.

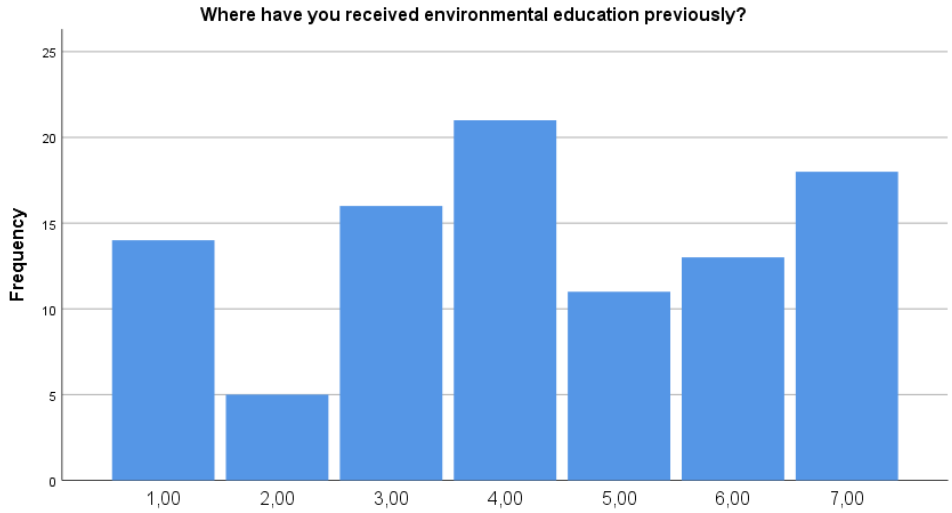


Figure 6.1. Environmental education perceived choices.

The chart above presents a table with the amount sources selected where respondents have perceived environmental education previously. About 21% (n=21) of respondents chose 4 of the options given and 18% (n=18) of respondents chose 7 of the options given, these being the highest number of frequencies. Over 80% of respondents had received environmental information via 3 or more channels (M=4,2347, SD=1,9344).

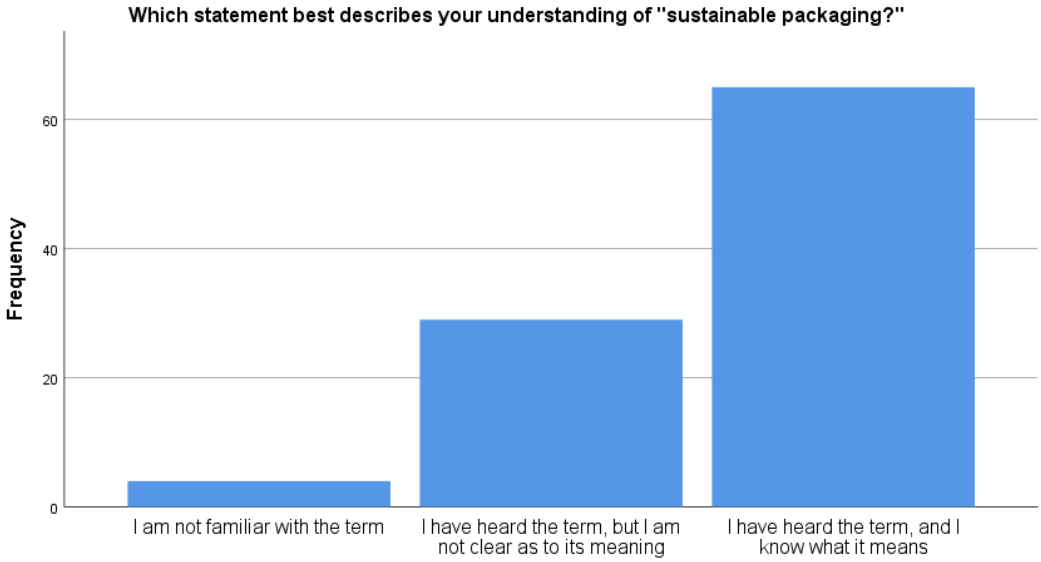


Figure 7. Perceived understanding of ‘sustainable packaging’ (Question 11).

Almost 34% (n=33) or respondents did not have a clear idea about what sustainable packaging means. While 66% (n=65) claimed to know the meaning of the term.

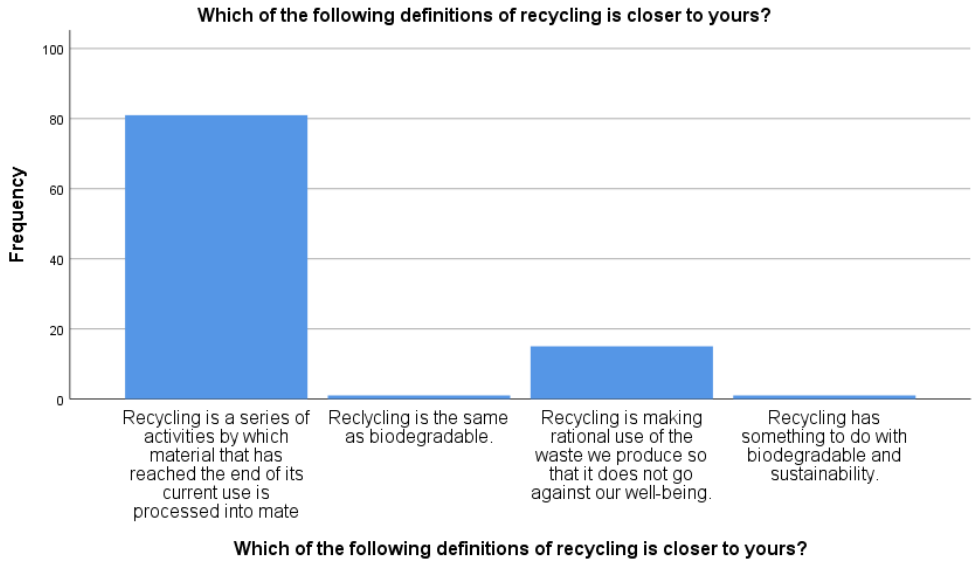


Figure 8. Recycling understanding (Question 12).

About 83% (n=81) of respondents chose the right option of the definition of recycling. While 17% (n=17) chose the remaining 3 options with wrong definitions about recycling.

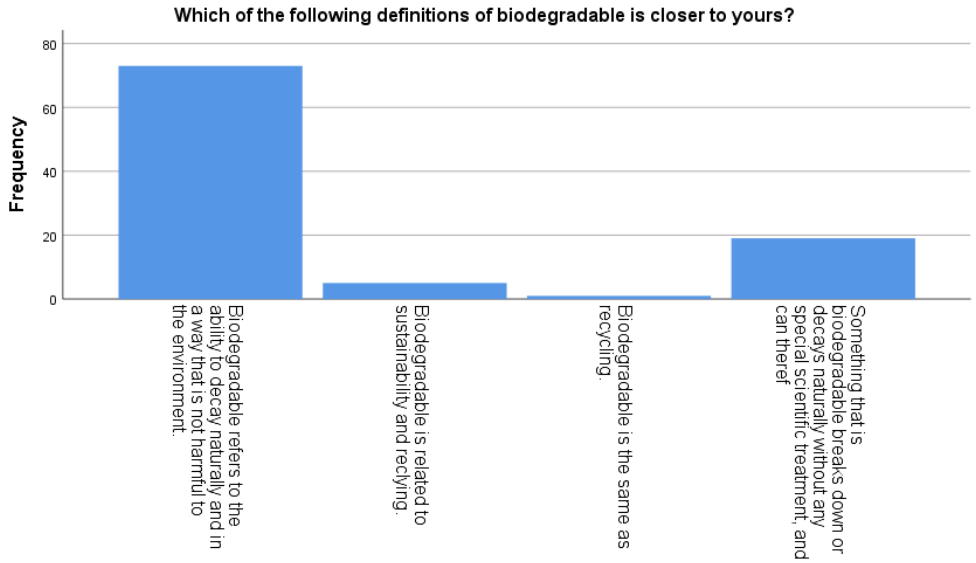


Figure 9. Biodegradable understanding (Question 13).

About 94% (n=88) of respondents chose the 2 option with correct definitions of biodegradable. The 16% remaining part of respondents (n=10) chose 2 remaining wrong options.

There were two informational questions (14, 15) where 72% (n=71) of respondents answered that they knew that the packaging sector generated million tons of plastic globally in 2016 (Question 14). However, 85% (n=84) of respondents presented to know that millions of metric tons of plastic are thrown into the ocean annually (Question 15).

# of responses	*Preliminary codes*	*Final codes*
8	Not considered responses	Responses that were not relevant or senseless and undermined the purpose of the question
20	Environment consideration	Environmental damage and resource usage as definition of sustainability
21	Future implications	Future generations and long-term periods as concern regarding sustainability definition
3	Relevance considerations	Sustainability relevance was acknowledged
6	Durability - Reusability considerations	Durability and reusability as definition of sustainability
18	Decision-making considerations	Responsibility in decision making and daily actions was remarked as definition of sustainability
3	Social and environmental considerations	Social and environmental considerations as a definition of sustainability
7	+ Economic considerations	Social, environmental and economic dimensions as a holistic approach of sustainability definition

Table 1. Final coding for open-ended question (Question 10).

The open-ended question (question 10) requesting the definition of sustainability identified 7 themes among the 94 responses obtained. However, 8 responses were not considered for the ambiguous content they presented. The remaining 86 responses are presented in the table above. The complete codebook is found in Appendix 2.

4.3. Consumers' behavior

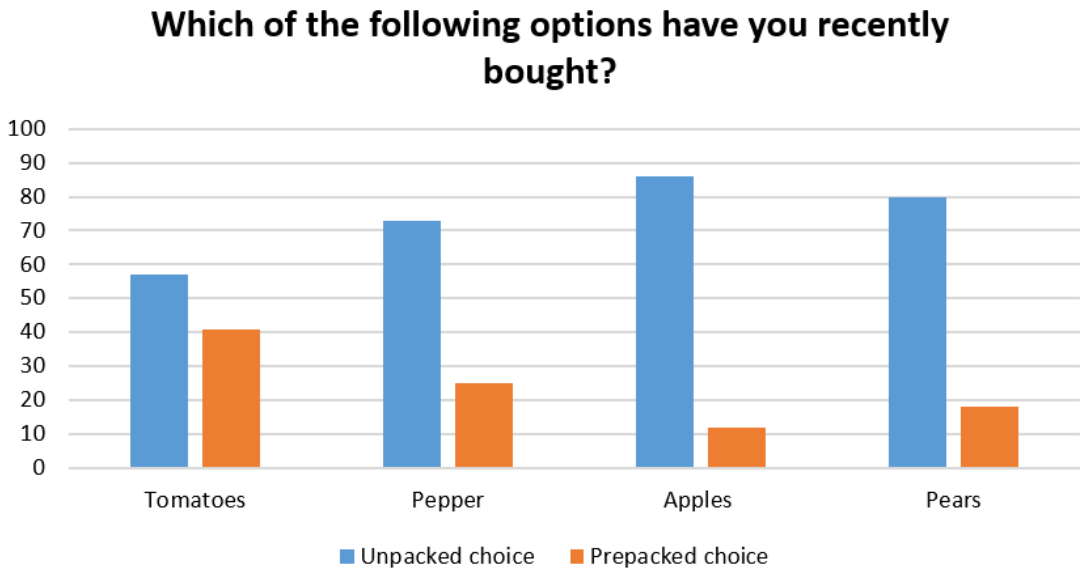


Figure 10. Respondents' behavior represented in realistic fresh product options through pictures selection (Question 3-6).

'Tomatoes selection'. Option 1, being the unpacked option, was chosen by 58% (n=57) of respondents. While 42% (n=41) of respondents chose the prepacked option, option 2.

'Pepper selection'. Option 1, being the unpacked option, was chosen by 74% (n=73) of respondents. While 26% (n=25) of respondents chose the prepacked option, option 2.

‘Apples selection’. Option 1, being the unpacked option, was chosen by 88% (n=86) of respondents. While 12% (n=12) of respondents chose the prepacked option, option 2.

‘Pears selection’. Option 1, being the non-packed option, was chosen by 82% (n=80) of respondents. While 18% (n=18) of respondents chose the prepacked option, option 2.

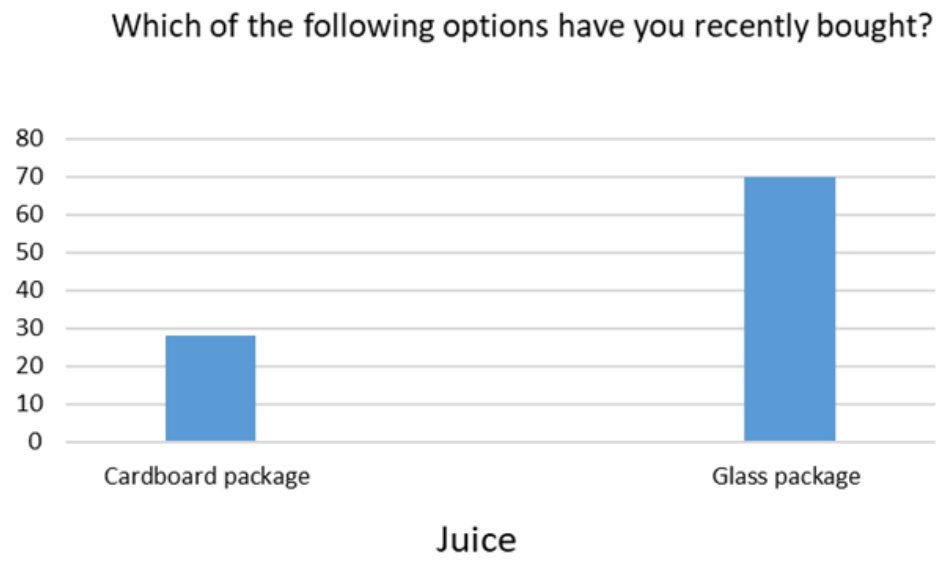


Figure 11. Respondents’ behavior represented in realistic juice selection (Question 7).

Option 1, being the cardboard package, was chosen by 29% (n=28) of respondents. While 71% (n=70) of respondents chose the glass package, option 2. Responses obtained presented SD= 0,45408.

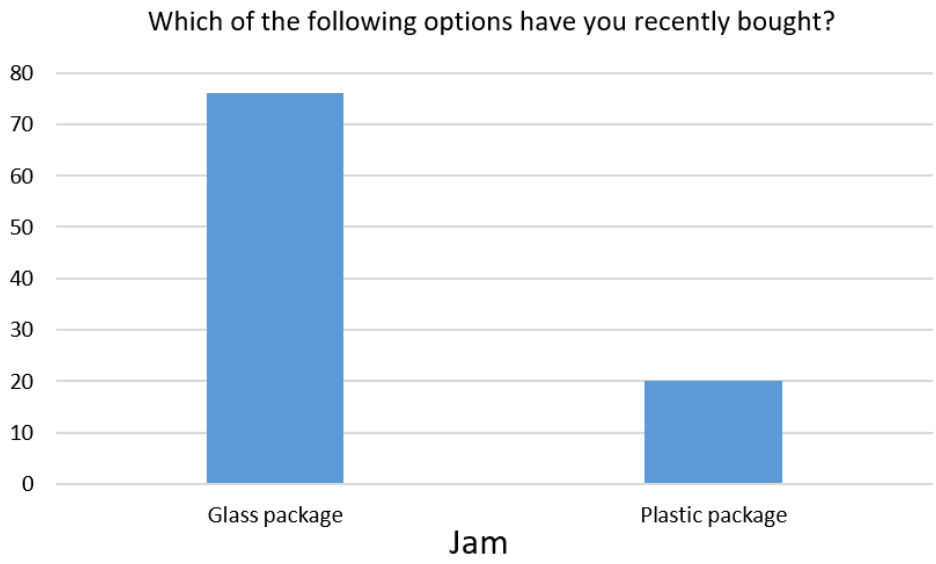


Figure 12. Respondents' behavior represented in realistic jam selection (Question 8).

Option 1, being the glass package, was chosen by 79% (n=76) of respondents. While 21% (n=20) of respondents chose the glass package, option 2. Responses obtained presented SD= 0,40825.

4.4. Consumers' attitude

Figure 13. Frequency of placement as individual options (Question 16).

Home option presented the highest frequency with 52% (n=51) of respondents. Followed by study place with 50% (n=49) of respondents. Whereas, workplace was chosen by 4% (n=4) of respondents. And “all above” obtained 33% (n=32) of respondents selections.

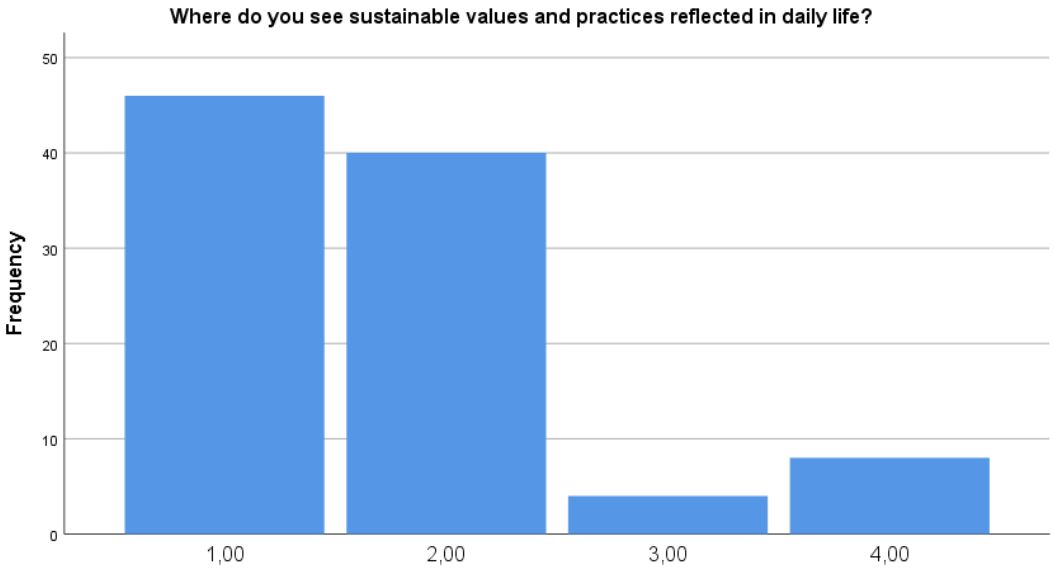


Figure 13.1. Placement of sustainable values and practices perceived.

About 47% (N=46) of respondents chose only one placement option given, about 40% (n=40) of respondents chose 2 placement options. Whereas, 8% (n=8) respondents chose to “all above” option proposed.

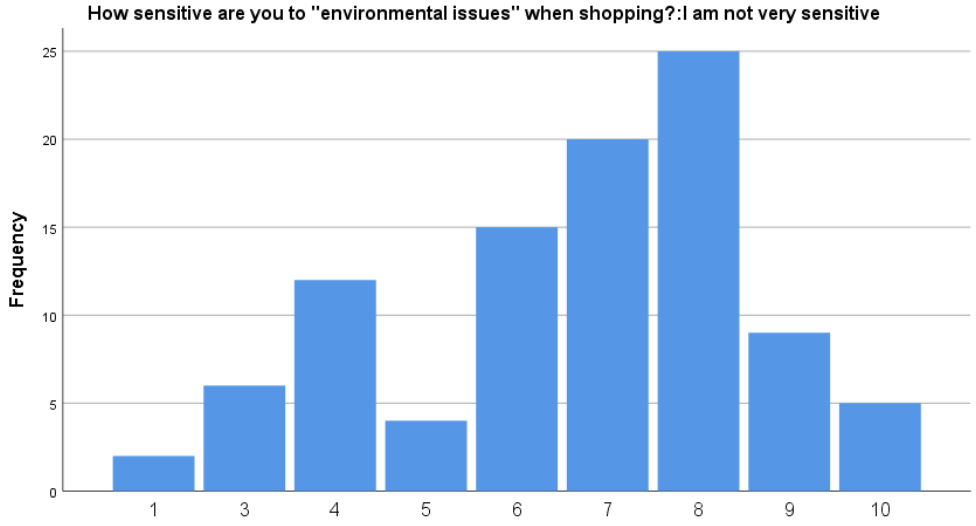


Figure 14. Environmental issues sensitivity (Question 17).

In a scale out of 10, 1 representing “I am not very sensitive” and 10 representing “I am very sensitive”, with 25% (n=25) of respondents presenting 8 as the mode (M=6,6224, SD=2,02823).

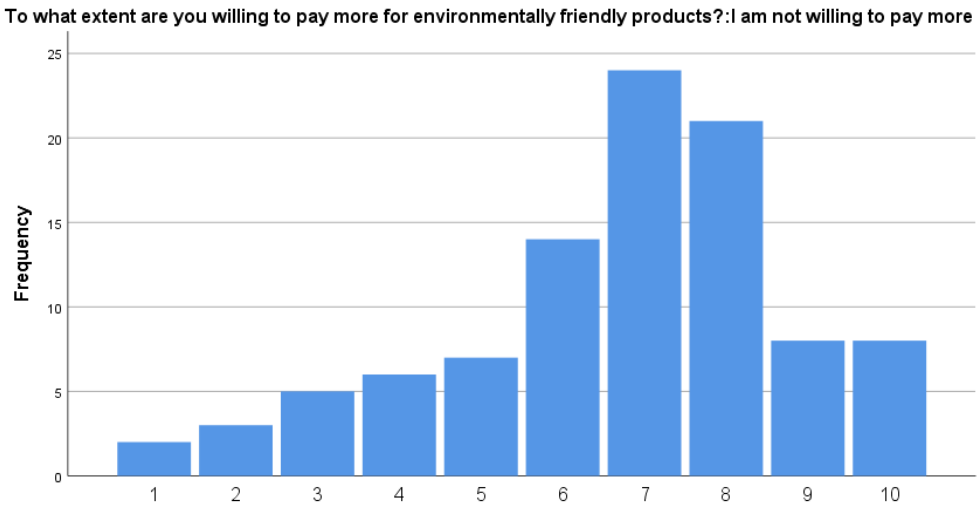


Figure 15. Willingness to pay more for environmentally friendly products (Question 18).

In a scale out of 10, 1 representing “I am not willing to pay more” and 10 representing “I am willing to pay more”, with 24% (n=24) of respondents presenting 7 as the mode (M=6,6735, SD=2,12387).

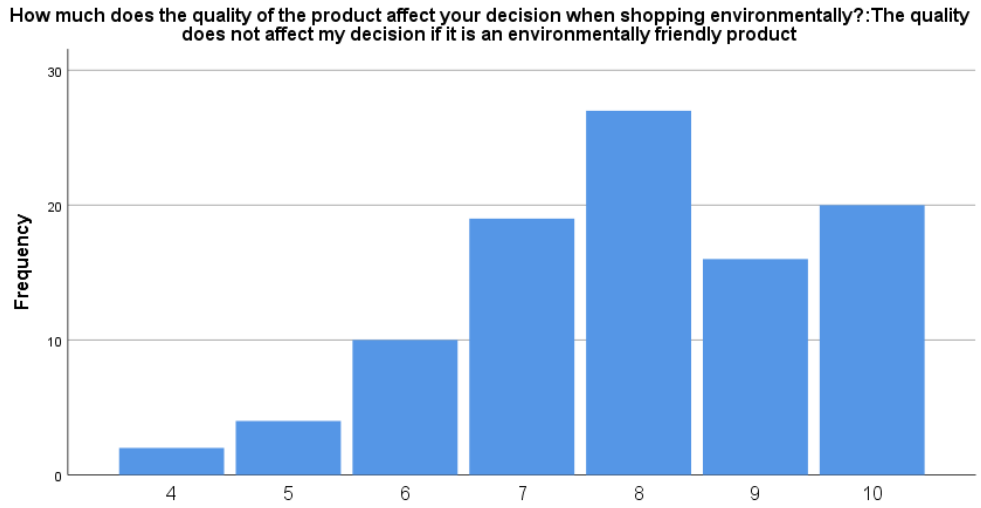


Figure 16. Quality as an influencing factor when shopping environmentally (Question 19).

In a scale out of 10, 1 representing “The quality does not affect my decision if it is an environmentally friendly product” and 10 representing “The quality affects my decision if it is an environmentally friendly product”, with 27% (n=27) of respondents presenting 8 as the mode (M=7,9694, SD=1,51592).

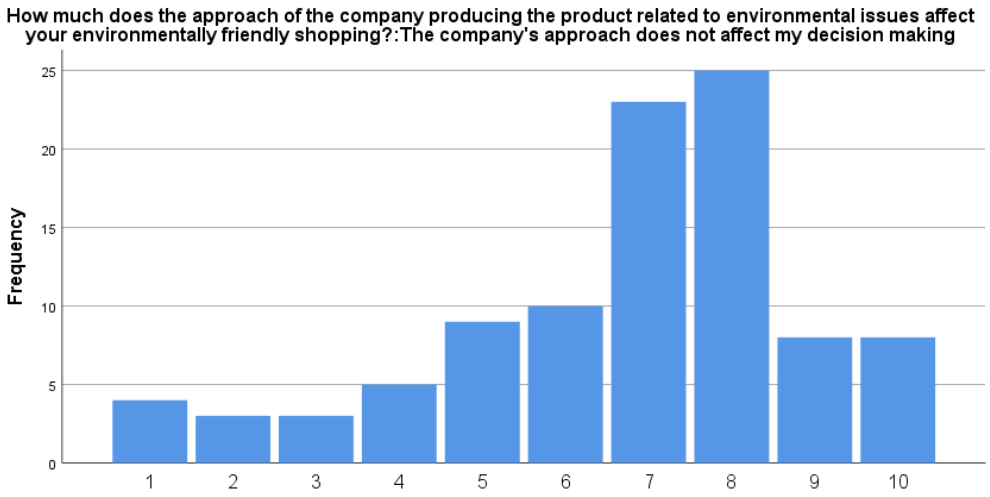


Figure 17. Company’s approach as an influencing factor when shopping environmentally (Question 20).

In a scale out of 10, 1 representing “The company’s approach does not affect my decision making” and 10 representing “The company’s approach affects my decision making”, with 25% (n=25) of respondents presenting 8 as the mode followed by a high frequency of 7 with 23% (n=23) of respondents (M=6,7041, SD=2,22084).

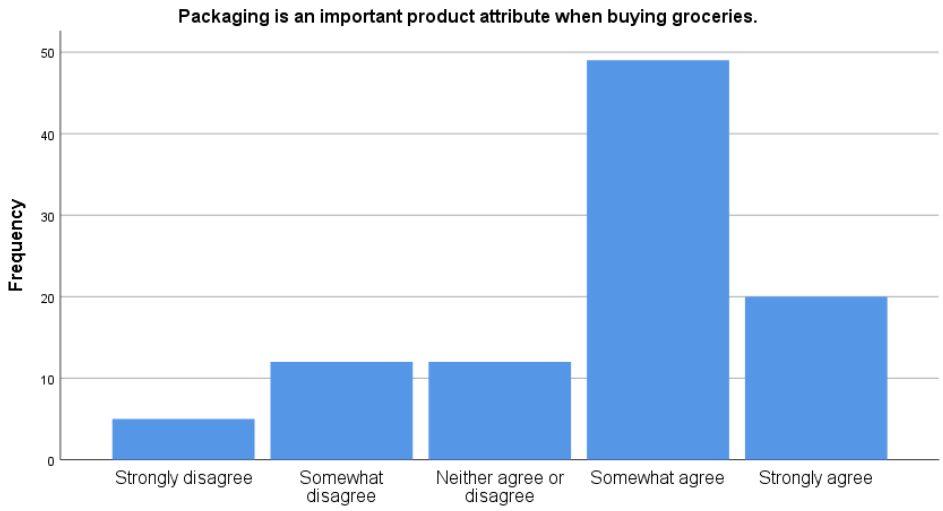


Figure 18. Perceived importance about packaging as a product attribute (Question 21).

With 50% (n=49) of respondents presenting ‘Somewhat agree’ as the mode (M=3,6837, SD=1,08975).

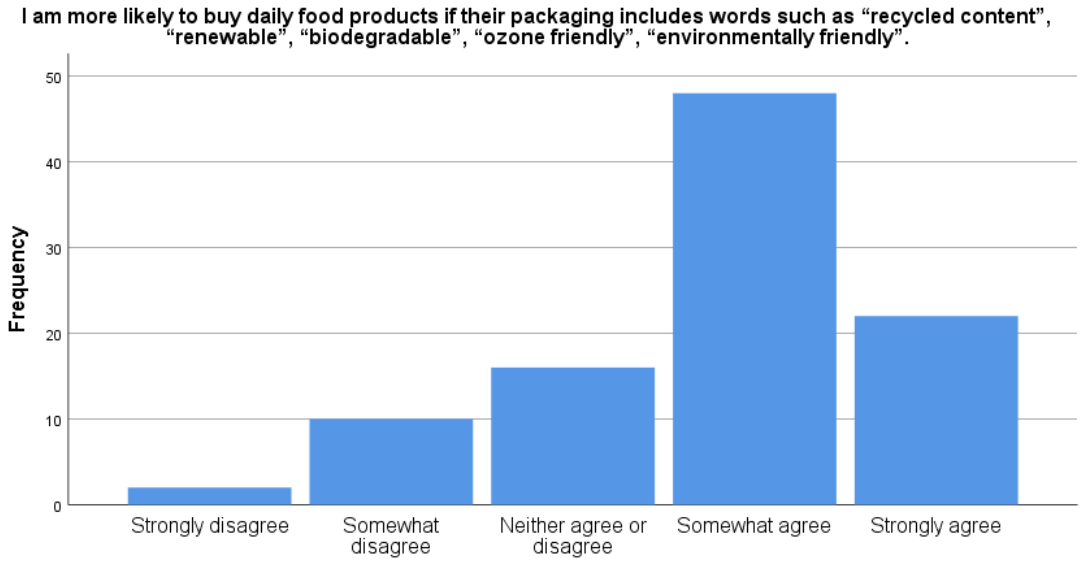


Figure 19. Likelihood to buy food products that include sustainable related terms (Question 22).

With 50% (n=49) of respondents presenting ‘Somewhat agree’ as the mode (M=3,7959, SD = 0,97345).

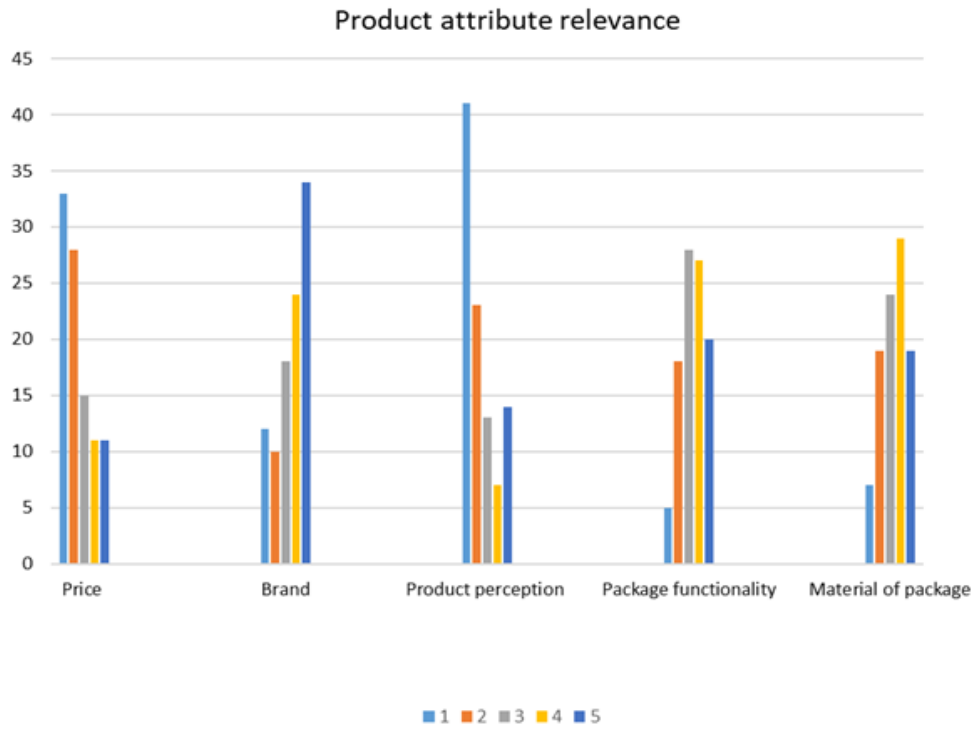


Figure 20. Product attribute relevance (Question 23).

In a rank of 1-5, 1 representing the most important and 5 the least important, with 42% (n=41) for product perception referring to quality as first option followed by 34% (n=33) for price.

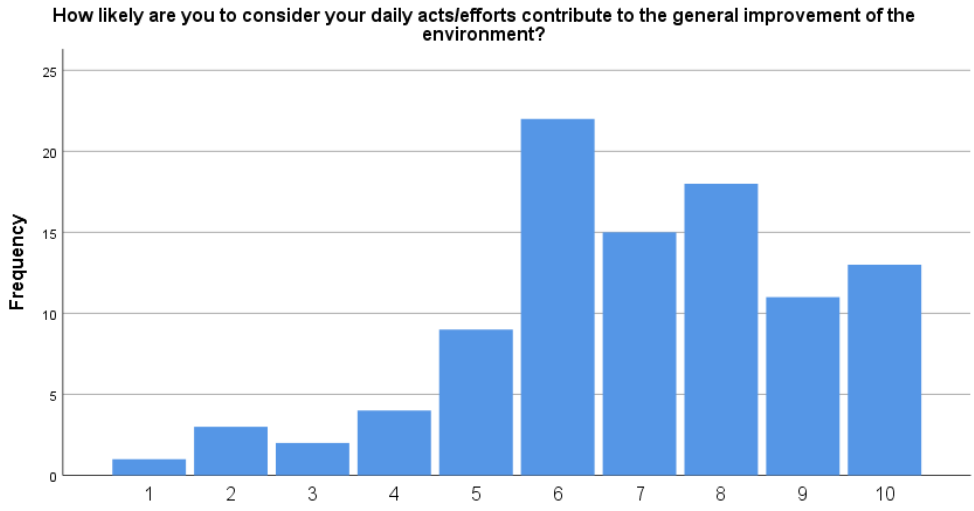


Figure 21. Consideration of self-actions as a meaningful contribution (Question 24).

In a scale out of 10, 1 representing the lowest score and 10 representing the highest, with 22% (n=22) of respondents presenting 6 as the mode (M=6,9796, SD=2,07081).

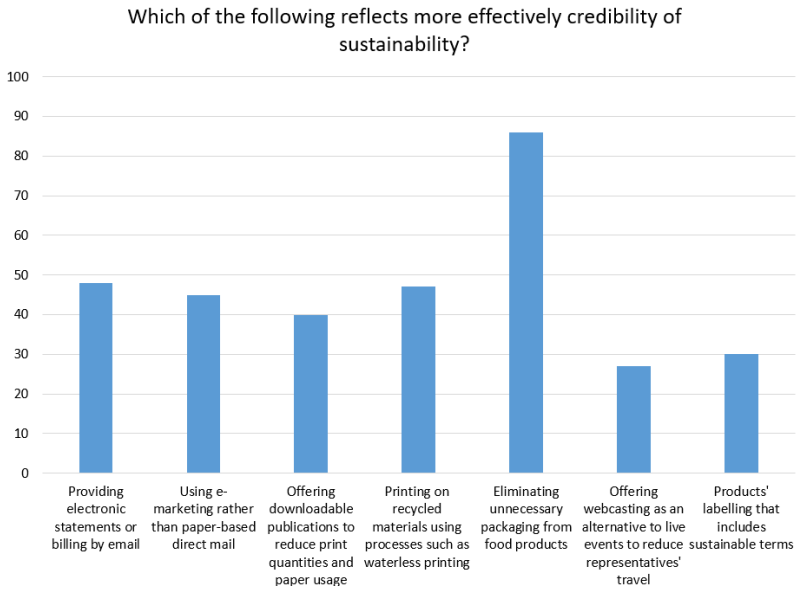


Figure 22. Frequency of effective credibility practices as individual options.

Eliminating unnecessary packaging from food products option presented the highest frequency with 86% (n=88) of respondents. The second highest practice was providing electronic statements or billing by email with 49% (n=48) of respondents.

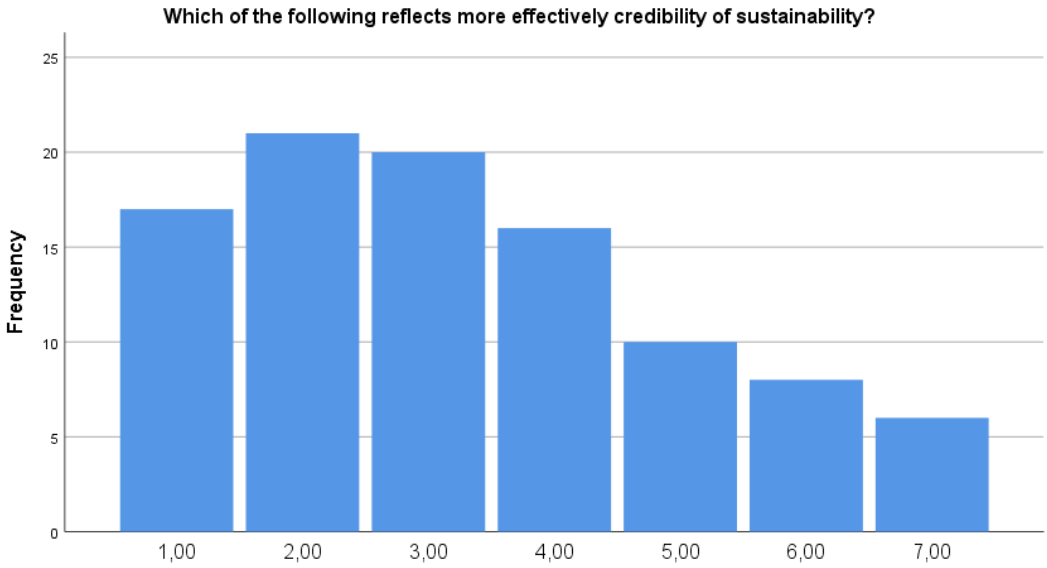


Figure 22.1. Practices that reflect more effectively sustainability (Question 25).

About 21% (n=21) of respondents chose two practices given, about 20% (n=20) of respondents chose 3 placement options. Whereas, 17% (n=17) respondents chose to only one practice offered.

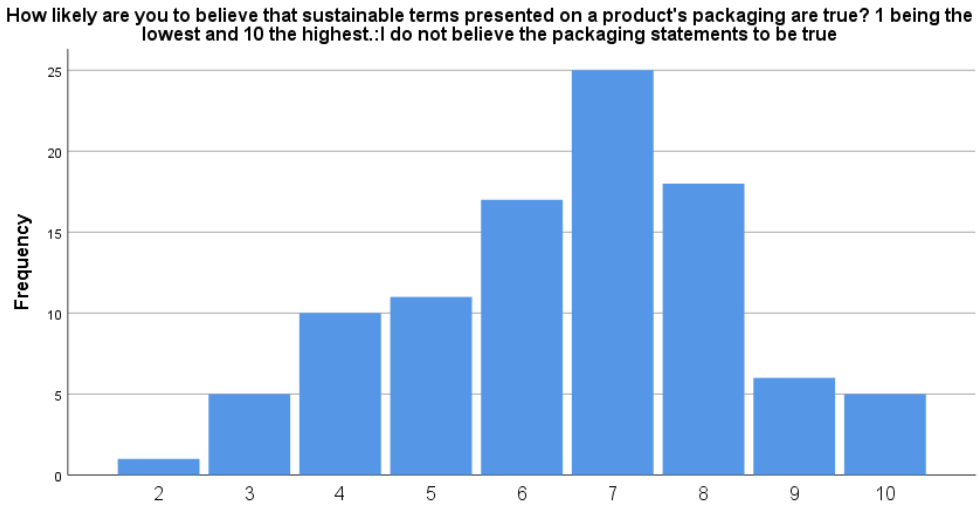


Figure 23. Credibility on sustainable related terms in packaging (Question 26).

In a scale out of 10, 1 representing the lowest score and 10 representing the highest, with 25% (n=25) of respondents presenting 7 as the mode (M = 6,5, SD = 1,81204).

5. DATA ANALYSIS

5.1. Hypotheses testing

From the survey proposed, different subscales were created in order to compare questions between each other, to address the hypotheses presented. The following table presents the questions merged and the new denomination of the subscale.

Number of the question	*Notation*	*Subscale name*
Question 3,4,5,6	VFC	Vegetables and fruits choice
Question 9	PEE	Perceived environmental education
Question 17,18,19,20	SE	Sustainability engagement
Question 23	PAR	Product attribute relevance
Question 25	PEC	Perceived effective credibility

Table 2. Notation for subscales created

H1: The concept of sustainability is not clear for consumers.

This hypothesis was tested by analyzing responses obtained from the open ended question. Figure 7 shows that consumer's defined sustainability within 7 themes, environmental consideration, future implications, relevance considerations, durability – reusability considerations, decision-making considerations, social and environmental considerations and finally, social, environmental and economic considerations. There were 86 responses out of 98 in total, where the highest theme repetition was future implications.

About 21 respondents seemed to be highly concerned about actual needs and resources usage compromising future generations and resources maintenance. In addition, consumers seemed to present some kind of attachment towards the environment. Some key words included "taking the environment in consideration", "helping the environment" and "protection". Thus, 20 responses reflected that consumers relate environmental damage and resource usage as a definition of sustainability.

As it was expected from literature and discussed in the interview, durability and reusability related responses were used to define the term. However, only 6 respondents did. Respondents also defined sustainability with decision-making considerations. About 18 responses addressed conscious and responsible choices in order to minimize environmental damage. Hence, this results reflect that sustainability is defined within one approach.

Nevertheless, 3 responses presented a holistic definition, it included social and environmental approaches whereas other 7 responses added economic approach or defined sustainability as a product type.

The hypothesis was partially supported. A minor part of respondents seemed to understand sustainability as a holistic concept, however, as it was expected, the majority seemed to focus in only one area.

> H2: The concept of sustainability is confused with recycling and biodegradable related terms by consumers.

This hypothesis was examined by analyzing recycling and biodegradable understanding through a correlation test between question 12 and question 13. The test showed that there is a significant correlation between the respondents understanding of recyclable and biodegradable (r=0,050, Spearman correlation =0,028). Thus, respondents seemed to perceive the difference of both terms by knowing the definition of each of them. However, this results do not explain if they identify sustainability entirely with recycling and biodegradability.

Contrary to Nordin & Selke (2010), consumers were able to distinguish the concept of recycling in this study. However, the previous hypothesis demonstrated that sustainability as a whole concept still tends to fall in the narrow perception of recycling and durability. Although, it was observed by a few number of respondents.

> H3: Consumers find sustainable terms included in packaging overwhelming while buying food products.

This hypothesis was analyzed by using a correlation between question 22 (figure 18) and question 26 (figure 23). The test showed that there is a significant correlation between likelihood and credibility (r=0,228, p=0,024). Thus, respondents are likely to buy daily food products with environment related terms as long as they believe those terms are true.

This analysis reflects Nordin & Selke's (2010) claim about the usage of diverse environmental related terms causing confusion and skeptical reactions might be accurate. If consumers do not perceive credibility on these terms, they will be skeptical to the product and would not be likely to purchase it. This creates a complex process for consumers where they have to unconsciously consider knowledge about the terms and attitude towards the product which is product perception.

H4: A considerable amount of consumers perceive the importance of food products that include sustainable approaches.

This hypothesis was tested by a correlation test between subscale VFC (Figure 26) and question 22 and question 26 in order to analyze respondents' behavior and attitude. However, both tests were insignificant. The frequencies for VFC subscale presented that in average respondents chose 3 out of 4 products with sustainable packages being free plastic (M=3,0204, SD=1,00493) while for the attitude scale 1-5 respondents the frequency has high as well (M=3,7959, SD=0,97345). In addition, credibility about sustainable terms included in products presented positive patterns as well (M=6,5, SD=1,81204). Thus, the hypothesis is not supported but data obtained presents a positive pattern regarding the expectations.

Previous literature has reflected that consumers are a key driver for the industry (Section 2.4.5). Therefore, consumers present their preferences through demand. An increasing interest in sustainable practices and environmental awareness has been perceived in younger generations, which has forced the industry to move from their conventional production to more innovative and environmentally friendly production processes. The analysis from H4 reflects that consumers perceive the importance of sustainable approaches in food products. Consumers were likely to choose the

plastic free options given for fruits and vegetables representing their interest in plastic avoidance. The options were initially proposed in the survey for questions 3-6 as a sustainable approach aiming to analyze consumers' responsiveness in a realistic product selection. Therefore, consumers are aware of sustainable approaches for the fruit and vegetable segment.

> H5: A considerable amount of consumers perceive the importance of sustainable packaging.

This hypothesis was tested by using an ANOVA test comparing question 11 and question 21. The test presented that there is a significant relation between the correspondent categories and continuous measures ($F(3,98)=3,045$, $p=0,052$). Respondents that were not familiar with "sustainable packaging" term presented higher indifference towards importance of packaging as a product attribute ($M=4,0$, $SD=0,81650$) than either respondents that have heard the term but were not clear as to its meaning ($M=3,2759$, $SD=1,16179$) or respondents that have heard the term and know that it means ($M=3,8462$, $SD=1,03427$). Thus, as respondents understand the definition of "sustainable packaging", they are perceptive to its importance as product attribute. In addition, respondents presented relevant frequencies for question 25 (figure 22) with "eliminating unnecessary packaging from food products" as the most selected option ($n=88$). Hence, the hypothesis was supported.

The analysis of H5 is highly correlated with the previous hypothesis. This hypothesis addresses the industry's approach for sustainable packaging and its responsibility. Previous research addresses the effect of labelling on consumers (Rokka & Uusitalo, 2008; Nordin & Selke, 2010) and it is demonstrated by the results obtained in this study. Consumers seem to perceive the importance of sustainable packaging as they are perceptive to packaging.

> H6: Consumers will pay a premium price if they perceive additional value, such as products including sustainable packaging.

This hypothesis was tested by making a correlation between question 17 and question 18. It aimed to analyze respondents' sustainability engagement with their willingness to pay for perceived additional product values. The test presented that there is a significant relation between both continuous measures ($p=0,632$, $r<0,01$). Thus, consumers will be willing to pay more for environmentally friendly products, as long as they are sensitive to environmental issues.

Hypothesis 6 indirectly addresses the inconsistency between willingness, behavior and attitude that was initially raised by Nordin & Selke (2010); Rokka & Uusitalo, (2008).. It aims to present behavior through desire of paying a premium price for products that include sustainable packaging. Therefore, the results obtained confirm that consumers are willing to pay higher prices for environmentally products if they are conscious consumers, as long as they are sensitive to environmental issues.

> H7: There is a low consistency between behavior and attitude towards 'green products'.
> H8: There is low consistency between willingness and behavior regarding the purchase of 'green products'.

Both hypotheses were tested by making different correlation tests aiming to measure consistency between behavior and attitude. Questions 19, 20, 21, 22 were compared with subscale VFC and did not present significant results. Although, they presented positive patterns with the expectation. However, SE variable ($M=3,02004$, $SD=1,44239$) did present a significant result ($p=0,244$, $r=0,016$). Thus, there is a relevant tendency from the respondent in choosing the free plastic choices and presenting a high sustainable engagement level.

Hypothesis 7 & 8 directly addresses the inconsistency between willingness, behavior and attitude that was initially raised by Nordin & Selke (2010); Rokka & Uusitalo, (2008). The hypotheses testing was not relevant and it did not present any significant results. It can be explained by the difficultly in measurement and complexity in product segment.

H9: There is an existent lack of involvement in sustainable efforts based on education and motivation.

Both hypotheses were tested by using multiple tests that could prove this statement. Hence, the subscale PEE and SE (Figure 26) were tested through a correlation test. It aimed to measure a relation between education and engagement perceived with the objective of analyzing education and motivation. However, this test did not present significance.

In addition, question 16 and the subscale SE (Figure 26) were tested through an ANOVA test. The test aimed to analyze the relation between the placement of sustainable values and practices reflected in daily life with sustainability engagement. Sustainability engagement representing motivation of respondents towards this practices. However, this test did not present significance. Nevertheless, respondents perceived less sustainable practices and values at workplace which presented lower means than the perception at study place and at home .

Furthermore, question 11 and the subscale SE (Figure 26) were also tested through an ANOVA test in order to analyze if consumers that presented a better understanding of sustainable packaging presented higher engagement with sustainability as well. The test did not obtain significant results. However, the test presented positive patterns to what it was expected. Respondents with the best understanding of sustainable packaging presented the highest mean regarding sustainability engagement. In addition, frequency of SE reflects that respondents' engagement towards sustainability was not remarkable as it was expected (M=6,99923, SD=1,44239).

Finally, question 11 and question 24 were tested through an ANOVA test as well. The test was done in order to analyze if respondents with a better understanding sustainable packaging considered their daily efforts contribute to the general improvement scope of the environment. The test did not present significant results. However, the test presented positive patterns to what it was expected. Respondents with the best understanding of sustainable packaging presented the highest mean regarding considering their efforts valuable. Hence, the insignificance of results can be explained by the size of the sample.

H10: Consumer education is reflected in their behavior and attitude towards sustainable practices.

Consumers' education resulted very complex to measure. It was not possible to see how the effect of it was reflected in behavior or attitude towards sustainable practices, even though multiple correlation tests tried to address this hypothesis. Thus, the questions related with knowledge were compared to the vegetables and fruits selection, sustainability engagement, environmental sensitivity. However, most of them presented no significance. Nonetheless, there was a correlation test between vegetable and fruits chosen and sensitivity to environmental issues presented significance ($p=0,287$, $r=0,004$). This meaning that as consumers are aware of environmental issues, their sensitivity would reflected in their behavior.

H11: Consumers present conflicting preferences between environmental and other product features.

Figure 21 shows respondents selection of product attributes in order of relevance to them. The hypotheses mentioned previously have demonstrated consumers' interest and engagement in sustainability. Question 23 reflected that for respondents the main product attribute given was product perception meaning quality followed by price. Thus, when multiple product attribute options are given to consumers, for instance, price, brand, product perception, package functionality and material of package as in the survey, consumers present conflicting preferences. Package functionality and protection of products did not present a positive pattern when it had to be chosen over the other product attributes. It was chosen as the most important attribute by 5% of respondents. While material of the package also presented unexpected results. About 7% of respondents chose it in the first place.

Along the survey respondents reflected their environmental concerns and sensitivity towards environmental issues. In addition, respondents were asked to choose different product options and they still presented positive results choosing the plastic free option. Thus, figure 21 supports the hypothesis and consumers' inconsistencies.

5.2. Interview review

The interview offered an insightful perspective from the industry. However, it was very focused on the project. The relevant information as industry is included in 'Main Findings'. On the other hand, the results from the survey were shown to the interviewee. It was claimed that they were fairly accurate and representative of consumers as a whole.

6. DISCUSSION

6.1. Methodology review

The research objectives were partially achieved. By the end of the thesis, an idea of consumers and food industry was built. As well as a strong idea of their role in sustainable food packaging through different areas. For instance areas as behavior and education for consumers and life cycle product assessment and business opportunities for the industry.

The interview offered an insightful view to understand how it is sustainable to produce a sustainable idea in the purposes of sustainable food packaging. The interviewee's choice was an excellent and realistic view of the industry's position regarding actual difficulties faced from their perspective. Therefore, it was able to see how consumers influence their decision-making processes, since the project was raised as a need for consumers and the environment.

In addition, the questionnaire offered a large amount of relevant information that allowed understanding consumers in a deeper level. However, it presented some inconsistencies that are discussed later in this section. That being said, understating consumers view was not completely effective because consumers feelings were not considered. However, a survey was an appropriate method for receiving information from them.

6.1.1 Limitations

The main limitation of this thesis could be the questionnaire design. The reason for the questionnaire design to be challenged is that the information received from it differed to some large extent from the literature reviewed. Limitations mostly emerge from the sample and ways items were measured.

For instance, question 1 should had been considered better. It could be possible that some respondents were not aware to what a 'retail store' is. Thus, some language barriers could explain this behavior since the amount of respondents who answered not to buy daily food products in a retail store was rather high (n=8). Other questions should had been considered better when trying to address the hypothesis stated. Knowledge related questions should had been formulated better. Measuring how much the respondent actually knows presented difficulties. Knowledge was recommended not be measured in a 'yes' and 'no' question. However, when following the suggestions received some data was very ambiguous. Thus, knowledge questions could had been taken a deeper insight. Nevertheless, the questionnaire was already long and respondents could had dropped it for its demanding content.

For future research in the field, it would be convenient to make a separate short questionnaire with the only purpose of measuring sustainability knowledge. The questionnaire should include open ended and multiple choice questions that aim to measure what consumers know, instead of if they know. The questions should focus on requesting definitions and concepts related to sustainability, in order to analyze if they are familiar with it. In fact, dichotomous questions are not recommended for its inconvenience.

The questionnaire also presented some cases when analyzing the results and addressing the hypotheses, some questions could had been asked differently. Some hypotheses included how the consumers feel and it was mistakenly not included in the survey. For the effective testing of them, a measure of personality traits would have been highly convenient. In that order, the type of consumer could have been identified or related to his behavior, attitude and knowledge among the responses. However, the hypotheses were designed after the questionnaire was designed.

On the other side, the established hypotheses only comprised consumers' perspective whereas the study's focus was industry's perspective as well. Even

though literature was reviewed for both parties, the study received a larger amount of information from consumers. However, the interview conducted offered a better understanding from the industry perspective. They were very focused to the project. Instead, the questions could have included a broader perspective to the industry.

6.2. Implications for international business

Even though this research was mostly focused on the consumer side, the outcomes highly contribute to the industry. They help the industry understand their consumers target better and help analyzing the path or ideals they are willing to include in their daily lives through daily decision-making processes. Secondary research has established some inconsistencies between willingness and behavior among consumers. The survey allowed respondents to reflect their positive perspective and concerns about the environment. However, not all their responses were aligned with initial expectations.

Consumers present conflict when choosing products and their relevance to attributes vary according to product perception. An ideal situation would be if all products include sustainable approaches and consumers would not have to make their choices between products based on their income or environmental knowledge. The situation would be different if products were affordable and easy to understand. In that order, consumers would implicitly know that there is a sustainable process behind the product and sustainability would not be a new concept to look at as strange.

Thus, according to plastic waste statistics, sustainable packaging is rather a need and industries play a fundamental role in it. Primary and secondary research offer an insight from the current problem and companies could be able to incorporate relevant changes, such as changes in their life cycle assessment processes to address this issue. Industries reluctance related with costs can be analyzed from the perspective

that innovation is expensive in the first place; however, it is not expensive in the long term when putting environment and society into account and still making profit from it.

In addition, companies could use marketing as a beneficial tool to help consumers make easier and better choices. Thus, educating consumers through marketing. For consumers with an average life style is difficult to be committed to everything, including the environment. It is impossible for them to know the origin and process of the product that states “recycled” on the package. The most probable situation is that a regular person who is not aware and informed about environmental issues will treat the package as another conventional package and throw it in normal trash.

Besides the industry educating the consumers and producing products they are willing to buy according to their changes in life style, companies can create value from these new approaches. Hence, food packaging is a sector that offers many opportunities for companies who are willing to make a change in the packaging industry.

7. CONCLUSIONS

7.1. Main findings

The study revealed that respondents presented some understanding from sustainability; however, very few understand it as a holistic approach. Sustainability was defined within 7 themes that were predicted from secondary research, environmental consideration, future implications, relevance considerations, durability – reusability considerations, decision-making considerations, social and environmental considerations and finally, social, environmental and economic considerations. Nevertheless, a large portion of consumers seemed concerned about supplying actual needs and resource usage compromising future generations and resources availability. It was a new perspective offered by the consumers that was not presented in secondary research.

In addition, the data analysis also presented that consumers have a clear understanding of recyclability and biodegradability as independent concepts. Thus, it

was inferred that these terms are not confused with each other and both represent practices in which sustainability is applied. However, as it was discussed in the interview, consumers tend to believe that recyclability and biodegradability are the complete definition of sustainability. Consumers do not relate the concept with society and economy sides. This was demonstrated in the open-ended questions, very few respondents identified the term as an integrated concept.

Respondents are likely to buy daily food products with environment related terms as long as they believe those terms are true. Thus, it can be assumed that if they do not trust the terms presented through the channel they were exposed (labelling), consumers will not find additional value on them and will not purchase 'green products'. Nevertheless, it was discussed in the interview that consumers present different attractions when buying products. The motives of purchase and the appealing of the product affect the selection of buying food products. For instance, when there are special family occasions, consumers are more likely to buy what looks nicer, what looks more tasty and also will most likely avoid to consider the packaging if the food looks delicious.

Even though the results were not significant to measure that some consumers perceive the importance of food products that include sustainable approaches, a large group of respondents chose the fruits and vegetables plastic free options. Moreover, the results presented that as respondents understand the definition of "sustainable packaging", they are perceptive to its importance as product attribute. They also presented "eliminating unnecessary packaging from food products" as the most chosen credible practice of sustainability. Thus, even if consumers are not largely committed to sustainability they perceive the importance of packaging in daily life choices. Respondents did not seem to be completely aware of the relevance of sustainability approaches in food products, however, they unconsciously reflected to perceive its importance among the questionnaire.

Consumers' willingness and trustiness in products that include sustainable approaches leads to the probability of consumers buying 'environmentally friendly products'. Now, the analysis carried revealed that consumers that perceive this additional value and present a high sustainability involvement are willing to pay a premium price or buy the available green product option. This meaning that as long

as consumers are committed and aware of environmental issues, they are willing to pay more for premium products. In addition, the results presented that some of the respondents actually apply these ideals in practice as well.

On the other hand, low consistency between behavior and attitude towards 'green products' was not significant. As well as, lack of involvement in sustainable efforts based on education and motivation did not present significance either. Nevertheless, these hypotheses presented in data analysis present the positive pattern that was expected and the insignificance can be explained by the size of the sample. In addition, it was not possible to measure the education effect in consumers' behavior and attitude. However, environmental education perceived was mostly chosen from internet and social media rather than formal education. This presenting that sustainability is a self-motivation practice in young consumers rather than taught.

In fact, the interviewee presented an insightful idea about the industry offering an easy way to encourage and supporting consumers through their products. This idea was based on only making it simpler, presenting products in a more efficient way for both the industry and consumers. For instance, when respondents were challenged to choose between a pre packed fruit against a non-packed fruit, they easily chose the free plastic option. But when respondents were requested to choose between a plastic and glass packages for the jam pictures selection, a relevant amount still chose the plastic option. This presenting that there are still conflicting preferences between product features as price and size among consumers. The same situation was found on the juice selection question, a larger amount of respondents chose the glass option over the cardboard option when the product and brand was exactly the same. This relationship presents that consumers prefer package functionality over environmental consequences, since the glass option included a resealable presentation while at the same time produces larger CO_2 emissions. Therefore, even in consumers present a high involvement in environmental awareness, there are still some inconsistencies regarding their attitudes and behavior that are presented in this study.

7.2. Ideas for further work

The suggestions for future research are mainly focused on improving the questionnaire. Future researchers should try to analyze each product categories since the results obtained presented very different information when more product attributes were included. For instance, free plastic options were chosen by the majority in the fruits and vegetables selection. However, when price, size and perception of the product were included, respondents presented conflicting thoughts. This was reflected on their jam and juice choices, respondents did not easily chose the more sustainable option. Thus, they had to consider more attributes and compare their relevance to them. Hence, consumers had to filter more information and based on that select their product. This presents that sustainability consideration in product selection differs in product categories.

In addition, researchers should analyze their audience better and concentrate their study on them based on deeper areas such as culture and education. Each country presents different levels of commitment towards sustainability and sustainable practices. Thus, education and location play a relevant role, since all countries present different incentives towards recycling or returning used materials.

Furthermore, researchers must support industry's approaches regarding how to transmit information through their products. For instance, homogenous labelling or scale per product category would make it simpler for consumers based on their understanding and sustainability perspective. Again, this based on consumers background.

Overall, every country presents large numbers of line production cycles in which they all are producing waste at some point during the life cycle process. Thus, offering new food packaging alternatives might be beneficial for both the industry and consumers side to include the triple bottom line concept of sustainability. Researches might be able to offer new insights that will reflect consumers' ideals, which might be beneficial for policymakers as well. Policymakers will have a clear idea of their consumers and new bans could be created against over packaging and under packaging practices. So more importantly, an improvement in this area will address food waste besides the avoidance of plastic consumption and conventional packaging.

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APPENDICES

Appendix 1. Complete survey.

Food Packaging Survey

1. This is survey about consumers' behavior on packaging.

I am a second year business student at Aalto University, and the results of this survey will be part of my Bachelor's thesis.

This survey will take you around 7 minutes to complete. The responses are anonymous, and will only be used for my thesis. If you have any questions about this survey, please send me an email (dannacamiladiazpabon@gmail.com) *

- ◯ START

2. Do you buy groceries at a retailer store? *

- ◯ Yes
- ◯ No

Please select the images according to your last purchases at the retail grocery store.If you have not bought any of the following products lately, please choose the one you would buy.

3. Which of the following options have you recently bought? *

Tomatoes option 1

Tomatoes option 2

4. Which of the following options have you recently bought? *

Pepper option 1

Pepper option 2

5. Which of the following options have you recently bought? *

Apples option 1

Apples option 2

6. Which of the following options have you recently bought? *

Pears option 1

Pears option 2

7. Which of the following options have you recently bought? *

Juice option 1 (cardboard package)

Juice option 2

8. Which of the following options have you recently bought?

Jam option 1

Jam option 2

9. Where have you received environmental education previously? *

- [ ] Elementary School
- [ ] High School
- [ ] University
- [ ] Home
- [ ] TV
- [ ] Social media
- [ ] Internet
- [ ] I have never received environmental education

10. What does "sustainability" mean to you? Please feel free to write as much as little as you would like.

11. Which statement best describes your understanding of "sustainable packaging?" *

- ( ) I am not familiar with the term
- ( ) I have heard the term, but I am not clear as to its meaning
- ( ) I have heard the term, and I know what it means

12. Which of the following definitions of recycling is closer to yours? *

- ◯ Recycling is a series of activities by which material that has reached the end of its current use is processed into material utilized in the production of new products.
- ◯ Reclycling is the same as biodegradable.
- ◯ Recycling is making rational use of the waste we produce so that it does not go against our well-being.
- ◯ Recycling has something to do with biodegradable and sustainability.

13. Which of the following definitions of biodegradable is closer to yours? *

- ◯ Biodegradable refers to the ability to decay naturally and in a way that is not harmful to the environment.
- ◯ Biodegradable is related to sustainability and reclying.
- ◯ Biodegradable is the same as recycling.
- ◯ Something that is biodegradable breaks down or decays naturally without any special scientific treatment, and can therefore be thrown away without causing pollution.

14. Did you know that a lot of plastic was globally generated by the packaging sector in 2016? (146 million tons) *

- ◯ Yes
- ◯ No

15. Did you know that a lot of plastic is thrown into the ocean annually? (8 million metric tons) *

- ◯ No
- ◯ Yes

16. Where do you see sustainable values and practices reflected in daily life? (e.g. printing or recycled paper, avoidance of plastic food packaging at cafeteria, etc) You can choose more than one option. *

- ☐ Study place (university)
- ☐ Workplace (office)
- ☐ Home
- ☐ All above
- ☐ None above

Please answer the following questions within the according 1-10 scale.

17. How sensitive are you to "environmental issues" when shopping? *

	1	2	3	4	5	6	7	8	9	10	
I am not very sensitive	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	I am very sensitive

18. To what extent are you willing to pay more for environmentally friendly products? *

	1	2	3	4	5	6	7	8	9	10	
I am not willing to pay more	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	I am willing to pay more

19. How much does the quality of the product affect your decision when shopping environmentally? *

	1	2	3	4	5	6	7	8	9	10	
The quality does not affect my decision if it is an environmentally friendly product	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	The quality affects my decision if it is an environmentally friendly product

20. How much does the approach of the company producing the product related to environmental issues affect your environmentally friendly shopping? *

	1	2	3	4	5	6	7	8	9	10	
The company's approach does not affect my decision making	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	The company's approach affects my decision making

21. Packaging is an important product attribute when buying groceries. *

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither agree or disagree
- ◯ Somewhat agree
- ◯ Strongly agree

22. I am more likely to buy daily food products if their packaging includes words such as "recycled content", "renewable", "biodegradable", "ozone friendly", "environmentally friendly". *

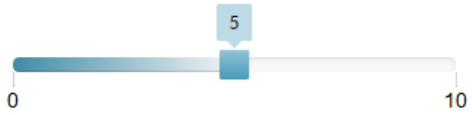
- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither agree or disagree
- ◯ Somewhat agree
- ◯ Strongly agree

23. Please rank the following in order of importance from 1 to 5, where 1 is the most important to you and 5 is the least important to you. *

Price	Select
Brand	Select
Product perception (quality)	Select
Package functionality and protection of products	Select
Material of the package (e.g. sustainable features)	Select

24. How likely are you to consider your daily acts/efforts contribute to the general improvement of the environment? *

I believe my individual actions will not contribute to saving the environment



I believe my individual actions will contribute to saving the environment

25. Which of the following reflects more effectively credibility of sustainability?(Pick more than one if you prefer). *

- ☐ Providing electronic statements or billing by email
- ☐ Using e-marketing rather than paper-based direct mail
- ☐ Offering downloadable publications to reduce print quantities and paper usage
- ☐ Printing on recycled materials using processes such as waterless printing
- ☐ Eliminating unnecessary packaging from food products
- ☐ Offering webcasting as an alternative to live events to reduce representatives' travel
- ☐ Products' labelling that includes sustainable terms

26. How likely are you to believe that sustainable terms presented on a product's packaging are true? 1 being the lowest and 10 the highest. *

	1	2	3	4	5	6	7	8	9	10	
I do not believe the packaging statements to be true	○	○	○	○	○	○	○	○	○	○	I do believe the packaging statements are true

27. What is your age? *

2 characters left

28. What is your gender? *

- ○ Female
- ○ Male
- ○ Prefer not to say

29. Which is your nationality? *

30. Do you live in Europe? *

- ◯ Yes
- ◯ No

31. Where do you live? *

- ◯ Capital district
- ◯ Other city with over 30 000 residents
- ◯ Other city with under 30 000 residents
- ◯ Other area

32. Do you live alone? *

- ◯ Yes
- ◯ No

33. What is the highest degree or level of school you have completed? *

- ◯ Less than a high school diploma
- ◯ High school degree or equivalent
- ◯ Bachelor's degree (e.g. BA, BS)
- ◯ Master's degree (e.g. MA, MS, MEd)
- ◯ Doctorate (e.g. PhD, EdD)
- ◯ Other

34. What is your current employment status? *

- ◯ Employed
- ◯ Student
- ◯ Both

Appendix 2. Survey open-ended question codebook.

n	***Raw material***	***Preliminary codes***	***Final codes***
8	Green	Not considered responses	Responses that were not relevant or senseless and undermined the purpose of the question
	Not killing all of the polar bears.		
	No littering		
	preachification		
	A process that can continue forward without needing external factors, it can survive on its own		
	Hippies and Vegans		
	It means keeping the quality of anything you are sustaining		
	Consciously choosing less environmentally friendly products		
20	Products that are made in a way that doesn't damage the environment	Environment consideration	Environmental damage and resource usage as definition of sustainability
	It means preserving/being as kind to nature as possible, and living according to this.		
	To me it evokes the propriety of an object or service that respect the environment		
	Helping the environment		
	Taking environment into consideration for better living		
	Protect the environment so that the world can last		
	I think sustainability is a broad term. In general, sustainability means the ability to maintain or exist at a consistent level. When it comes to the environment, it means the ability to keep the environment clean by making efforts to reduce the amount of carbon dioxide, plastic wastes, and other things that can pollute the environment.		
	It doens't consume or damage in a Way that cannot be undone		
	Better for our global environment		

	Using enough resources at a renewable level, overall making no major difference to the world.		
	Something that is environmentally friendly and does not put a big burden for the nature		
	Using or doing something in a way that has no negative impact on the external environment and can be continued indefinitely.		
	To be able to use a resource in a way that ensures there will be continued supply of it for future use and that its use is not so damaging to the environment that it will eventually prevent you from using such resource		
	Using our resources sparingly		
	Having the ability to maintain something in a perfect way		
	That whatever it is in question, it is produced so that it doesnt destroy earth.		
	Buying and using things so that our globe would sustain it		
	sustainability is when something can be used or produced indefinitely to the future, meaning that no phase of its life cycle uses more of the natural resources than the nature can grow back during that same cycle		
	Something is sustainable when, even if produced and consumed in large quantity, it doesn’t affect the environment and has no negative consequence on it		
	Sustainability is the most environmentally friendly option available. It means that the world would be able to keep up the "sustainable" practices for a very long time without damaging the earth too much.		

21	It means that as humans, we should keep in mind the impact of our actions on future generations and the environement	Future implications	Future generations and long-term periods as concern regarding sustainability definition
	Caring for the environment in a way that allows future generations to enjoy it as well		
	It means enjoy the goods without compromising our futur and the futur of the next generations.		
	Consuming and producing logically to preserve future generations' resources		
	Find ways to respond to today's needs without putting in jeopardy future generation' ability to respond to their needs		
	It means our decisions and actions won't have a prejudicial impact in the future.		
	My choices are sustainable if they won't affect the future generations' freedom in making the same choices.		
	Meeting the needs of the present while also thinking about future		
	Sustainability is the ability of current generation to meet their needs without compromising the next generations to meet their abilities		
	Not ruining things up for future generations		
	Doing things in a matter that does the least harm possible in the long term.		
	It makes me think of solutions we should find for a long-time period.		
	Sustainability is an ability to inherit common resources and environment to future generations through protection.		

	To me something is sustainable, when we are able to fulfill our needs in the present without harming or compromising the needs of the people in the future.		
	Doing everyday things with the long-term in mind. Being conscious about what your purchase in terms of thinking about the long-term and recycling the product.		
	Continuous use of something without losing the resource for good at some point in the future		
	making choices that would guarantee better future for everyone in terms of the environment and nature		
	Living in a way that would allow the Earth to thrive for years to come		
	Something we can keep doing for at least the next century without it causing issues		
	Something we prepare for future generation. It would be good if I care in my purchase every time, but I do not feel responsibility that much to be honest.		
	follow the rules and the advices in order to respect the planet as much as I can for my interest and the others' one		
3	To me it is something that everybody should hold as a priority.	Relevance considerations	Sustainability relavance was acknowledged
	Important for the future		
	I feel it is really inportant and people need to pay more attention to it. Little things can make a huge difference		
6	That most items used in production can be reused and we are not just adding things to the landfills	Durability - Reusability considerations	Durability and reusability as definition of sustainability

	When I think about sustainability, I think about long-lasting option rather than one time use products.		
	Things that last		
	Something durable-reusable. For a better future		
	Long lasting		
	Reusability		
18	Responsibility for making good choices concerning the environment	Decision making considerations	Responsibility in decision making and daily actions was remarked as definition of sustainability
	The actions do not hinder wildlife, nature, economy, people etc. in a way that would bring irreversible damage to a lifestyle/ecosystem		
	Sustainability to me is making small actions and choices in daily life that are more sustainable and better for the environment		
	It means actions that do not cause any more environmental damages than environmental benefits.		
	Being responsible for the environment, focusing on decisions that are good for the environment, instead of ignoring it		
	We make choises in our daily lives that are more beneficial to our Planet and makes it liveable to us all.		
	I define my sustainable behaviour by the way i consume products : vegetarian habits, local supply, avoiding as much as possible packages, season fruits and vegetables, second hand clothes, no single use plastic. The way i travel : avoid individual car, use train and public transport as much as possible. The way i act: recycling, associative mission..		
	In my day to day life : no plastic, eat local fruits and vegetables and from the good seasons		

	act environmentally friendly and be (partly) responsible for the protection of nature and its resources		
	Responsible consumers		
	I relate sustainability often to environmental actions. It means to me responsible decisions to ensure that we can have this world also in the future.		
	Making choices that reduce my environmental impact.		
	Making decisions that benefit the earth		
	Making choices that are better for the environment, taking the environment into account in your behavior and consumption		
	Living today as assuming intergenerational responsibility for our choices. Ensuring that my own choices in life aren't a burden for the environment or the society.		
	choices in ones individual life that consume as little resources as possible		
	Favoring reusable or recyclabe materials. Only buying clothes etc when I need them, focusing on quality over quantity when buying something.		
	Try to help us to live better and eat better, and helping the planet to survive.		
	Eco-friendly lifestyle		
3	Sustainability means taking care of the world and all of its inhabitants	Social and environmental considerations	Social and environmental considerations as a definition of sustainability
	Sustainability is like a lifestyle to me that I try to consider in every aspect of my everyday life, whether it comes to energy consumption or consumer choices. To me sustainability takes into account social and ecological responsibility.		

	Sustainability means producing products in a way that takes into consideration the society and environment and can be done long-term in a way that doesn't harm the environment or society.		
7	I think sustainability is a very wide topic. Most people consider it a three-dimensional concept including environmental, social, and economic aspects. Overall sustainability is uusing the resources of the present without compromising the resources of the future	+ Economic considerations	Social, environmental and economic dimensions as a holistic approach of sustainability definition
	Sustainability is a way to continue the economical development while considering the impact of our action on the future. Being sustainable is having low impact on Earth, health and in overall on the following generations		
	Be able to genate either income or value, without using more resources		
	Environmentally friendly products		
	When I think of sustainability I think of being environmentally conscious and being well-informed of what the environmental impacts are of different processes across a multitude of industries.		
	Sustainability means that a product was produced by cutting excessive carbon footprint and that the product's (if not food) lifecycle ends with recycling and its parts can be reused to an extent.		
	In business context I associate 'sustainability' with triple-bottom line. For me personally, sustainability is keeping ecological footprint reasonable by recycling, using public transportation, avoiding plastic and eating less meat.		

Appendix 3. Interview transcript

Interviewer: What is the project about?

Interviewee: “The PH project is a collaboration between LUKE the natural resources institute of Finland, VTT the technical research center of Finland , us LUT and then Åbo Akademi, which is in Turku. We together are studying lot of different angles of the food packaging industry. We are not looking at beverages; we are only looking at the food packaging industry and only in fully recyclable or fully biodegradable packaging. We are trying to get away from plastic and then substitute it with something. LUT, which is where I work, we look at the business model side of things because we are the business administration department. VTT is doing the actual testing, LUKE does the life cycle assessment and then OPRO academy is doing the customer segment. We are trying to check the challenge from all of the angles that a holistic solution would have to look at. And then we feed a lot of that information into the environmental ministry for Finland.“

Interviewer: Why are you offering solutions for food packaging? What are your motivations?

Interviewee: “Because of global issues like plastics in the oceans that get into our food and we don’t really want to eat plastic in our food. Because of climate change involves rising sea levels, CO_2 emissions, methane emissions and all the other greenhouse gasses. It’s also just to have a different perspective on economy like ‘Why would we waste something, throw it in the landfill if there is no need for it? Can we do things better?’. Since the industrial revolution, we’ve been progressing, quality of life has been increasing across the entire world, disproportionally but it has. And now we have gotten to a place where we are at some point looking at final resource or resources that won’t be available. We have to start to be proactive to make it change and this is again liked to climate change. It’s because we can do better, we should do better, we have to be better.”

Interviewer: What kind of challenges do you face along the process of development and production of these new alternatives?

Interviewee: “There is the technical side, regulations side and consumers’ side.”

“From the regulations side of course it’s with hygienics because it’s food. We can always say that we want to get rid of plastic, yes. But plastic has a lot of really good qualities, it does make things last longer. So we have to make sure that whatever we are creating has the same or equal qualities at least to sustain food, whether it’s yogurt or fish or whatever it is, that has to be very sure to not go bad before us eating it.”

“Then there is the technical side. When companies invest in machinery, it’s a big investment and it takes a lot of time for them to write it off usually. And if they did a big purchase 2 years ago, there is probably going to be another 8 years before they are going to purchase or accounting on purchasing new packaging machinery. Let’s say that they want upgrade to IUT based or AI machinery that could cut a waste in the design phase. That is then 8 years down the road so it changes very gradual, very slow moving process. That’s one of them. There is also recyclability, for

instance. If we all want our meat in black plastic, they are really hard to sort at the recycling facility because the dark colors take the introvert laser and consumes all the color, so the laser that sorts it can actually see if it's is one type of plastic or another. So there are a lot of technical issues, that is then linked."
"We want black plastic things for our meat because that makes the meat look delicious, that's the consumers side. In companies are not here if they don't have consumers, so they need to be able to sell the staff to the consumers. From what I've read in research, consumers know something intellectually but they chose with their hearts very often. There is some emotion connected to buying something and meat, which is often slightly more expensive food source than grain for instance and if you have the family, you want to buy the meat that you consider nice, what looks right, what doesn't look pale or old or something like that. So we have a lot of it."

"And then the fourth dimension, which is where I work with, is the business model. How do you actually change the value proposition to become something that makes sense, the whole way around and make a profit out of something that for a long time companies have not being able to make a profit out of, like recovering materials. I haven't seen a lot of companies that have been able to make a business out of it yet. I know that you can get paid for somebody's pick your cardboard if you have a lot of it and if it's clean. But it's very few companies who can make a living out of it. And cardboard is one resource, then we have metal, we have glass. Those are very easy and the traditional way at least in Europe to have been able to recycle but 'what about chairs, couches, sweaters that are mixed materials also?' That's hard."

Interviewer: For a large industry as packaging is, costs represent a relevant part. How is it financially feasible to include these new approaches for companies? How do you encourage companies to include them?

Interviewee: "I'm going to go out on a limb and say that every new development is expensive to introduce to the market. So I'm going to use an example, solar panels 30 years ago was extremely expensive and only billionaires and millionaires could afford to be cool and have solar panels. The cost of a solar panel now is so that most people even in developing countries can afford it if the pricing is right with the right agreement and it is because the more put them on the market, the more we learn about the product and the more machinery we get to mass produce things. So the packaging we are developing or co-developing will be expensive at first but all packaging has been expensive at first, all products have been expensive at fist. That is not to say that this will become easily cheaper at some point but we are working with different models. In the beginning you introduce stuff and say "could you pay a dollar more if you can get a better packaging deal?". I just ordered a dress which is out of hemp material and in that they were like you get a 10% discount if you buy the sending package that is 3 euros more but it has to be send back. So, I am using a reusable package that has been sent to my house when I return it to them and they get it back I get a 10% discount that assures them that I buy something from them again because "uh I have a 10% discount and for me I am like uh I have 10% off that's great." Food packaging you can't do that per say, but that's when product does a service comes in. This is just from the top of my head, what about a pizza box that is reusable? It could be something that is like plastic, corn starch for instance. Corn starch is fairly cheap and it has the same properties as plastic over shorter time spam. So if we would have somewhere where they would get washed properly and

be hygienically clean, why wouldn't that be able to work?. We have Wolt now that delivers food, what if they have a stack of pizza boxes and would just go into the pizza place and be like *absorbing sound*, here is the pizza and then go to the place and deliver them and take them again?. So would that family will be willing to pay 2 euros more for that kind of packaging? Maybe? Maybe not? Maybe it will be incorporated in the Wolt service, so that the delivery of the service just costs 2 euros more. But this is what I am still studying, this is what we are finding out, there are different business models, sharing platforms and this kind of things."

Interviewer: How do you call attention regarding packaging through stakeholders?

Interviewee: "That is the difficult part if we talk about consumers, they industry is pretty easy to get to talk to because they are interested in either increasing market share, future proofing so that they will stay profitable for the long term or because they want to have saving. Eventually, it's my prediction that most of these business models that are circular or sustainable will be more profitable because there will be bans on different varieties like single use plastics from the EU. But also it cannot in my mind and what I am trying to proof right now in my research, if you have to keep producing something that has to be thrown away, that is one business model. But if you produce stuff that lasts longer, you can incorporate your name onto that a lot easier, so that people would keep seeing it in their home or whenever it gets developed so the branding grows the knowledge or the recognition."

Interviewer: Have you produced any packaging?

Interviewee: "No, not yet. We started 1st of September. We are working on few things but we haven't produced anything. We have 4 years in the project."

Interviewer: Are you only cooperating with businesses that are including sustainability approaches already or are you encouraging conventional business as well?

Interviewee: "So VTT is already working on cellulose based packaging, those will be tested in companies that are already pursuing sustainability because they have an interest but we're also working with startups. Kamupak, they are right now testing reusable salad bowl. You know, when you go to the supermarket, in K market and S market you can buy salad buffets. And they are now testing in Helsinki in different K markets if costumers are willing to pay I think it's 3 euros to have this reusable box that they then bring back, they give to the supermarket, which then gives them to Kamupak and then they take a new one from the same kind. But it means that they have to take it home and bring it back, so there is slight inconvenience if you are going somewhere maybe some customers don't want to bring an empty pack. But that's what they are testing. So we are working with startups like that, we are also working with Fazer, who has a lot of good intentions and lot of people, money invested in R&D. But we are always open for something new or something else to start on."

Interviewer: How do you face skepticism regarding packaging quality and price?

Interviewee: “It’s difficult but that is just to prove that it’s not a problem. I mean, we are testing all our products to the same standards especially in the food packaging industry. There is no way that anything will be approved by the government or for production if it does not work.”

Interviewer: How do you think sustainable consumer culture can be mainstream?

Interviewee: “Yeah, how do it think? Personally, I would like that all products you can buy in the supermarket would be sustainable so the customer can picks whatever they want, as usual, but all of the choices are good. That’s it where I would like the world to be because that would mean that is a push strategy rather than pull. We sadly most families, people who go shopping have a lot of stuff going on their lives, it’s impossible to know about every single thing that you are going to purchase, like everything from shoes to food, to chairs. So if all of it would be produced sustainably, then you can pick whatever is available. That would be nice.”

“Well marketing works but it’s overwhelming for consumers or anyone consumer to understand the consequences of every single choice you make when you buy something. That is overwhelming even for me, and I am interested in it and I know about it.”

“We have labels for everything. The other day I went to the supermarket and saw a new label and I was like “hah, something new green, cool”. I bought it so I knew I could look it up. It was an individual company that has created their own label for their own products. This is difficult to find the way as a consumer. I don’t know how to encourage consumers other than for consumers to understand the importance of their choices. As I said before, it’s difficult to understand and then to actually implement it also because you do understand something but then if all the sustainable paper looked brown. Let’s say that. You would be like “I don’t want brown paper in my house, because you are used to white meaning clean”. That’s why I said marketing, marketing works. Otherwise we wouldn’t have all these huge companies. But it has to be marketing with our purpose, our sustainability purpose, that is not green washing, that is not putting all the products at the same because then marketing won’t work. If marketing says, all the products are great, then we are lost.”

Interviewer: How have you been analyzing consumers?

Interviewee: “Right now we have been doing focus groups, we are doing individual open ended question interviews and ethnographic studies for this year. The project was funded by academy of Finland, so we are focused on Finland because it’s for the environmentally ministry also. So we are working mainly on Finland, our collection is in Finland but then we look at research that has been in other places and compare it to see if there are similarities.”

Interviewer: Do you think this cellulose based alternatives would work in other country besides Finland?

Interviewee: “Of course, when they are finished. But it will take a while. If we add a point where we are scaling up, it would mean that the incremental cost is lower. There is a lot of forest in Russia, in the US, Canada. If this product comes to a point where it is a success, then the incremental cost when scaling up will hopefully allow

other countries that don't have high salaries as Finland or Scandinavia in general, to also be part of that."

The survey and its results were shown to her with the purpose of analyzing its accuracy compared to their consumers' understanding. These were some comments made:

"This is actually just an example of what I said about marketing works, they look nicer or they look equally big or whatever they presented nicely or they are easier to take because they don't have to go take a sticker…"

"Durability is correct but not the whole idea. Hippies and vegans it's the same what people would say about tree huggers and that's when people are trying to say environmental sustainability and I'm like we can have the whole triple-bottom line, three pillars discussion forever and I think this might show that they do not understand what sustainability means as a holistic concept…"

"I think the results are fairly accurate, just minus but from what I have read and observed it seems representative…"